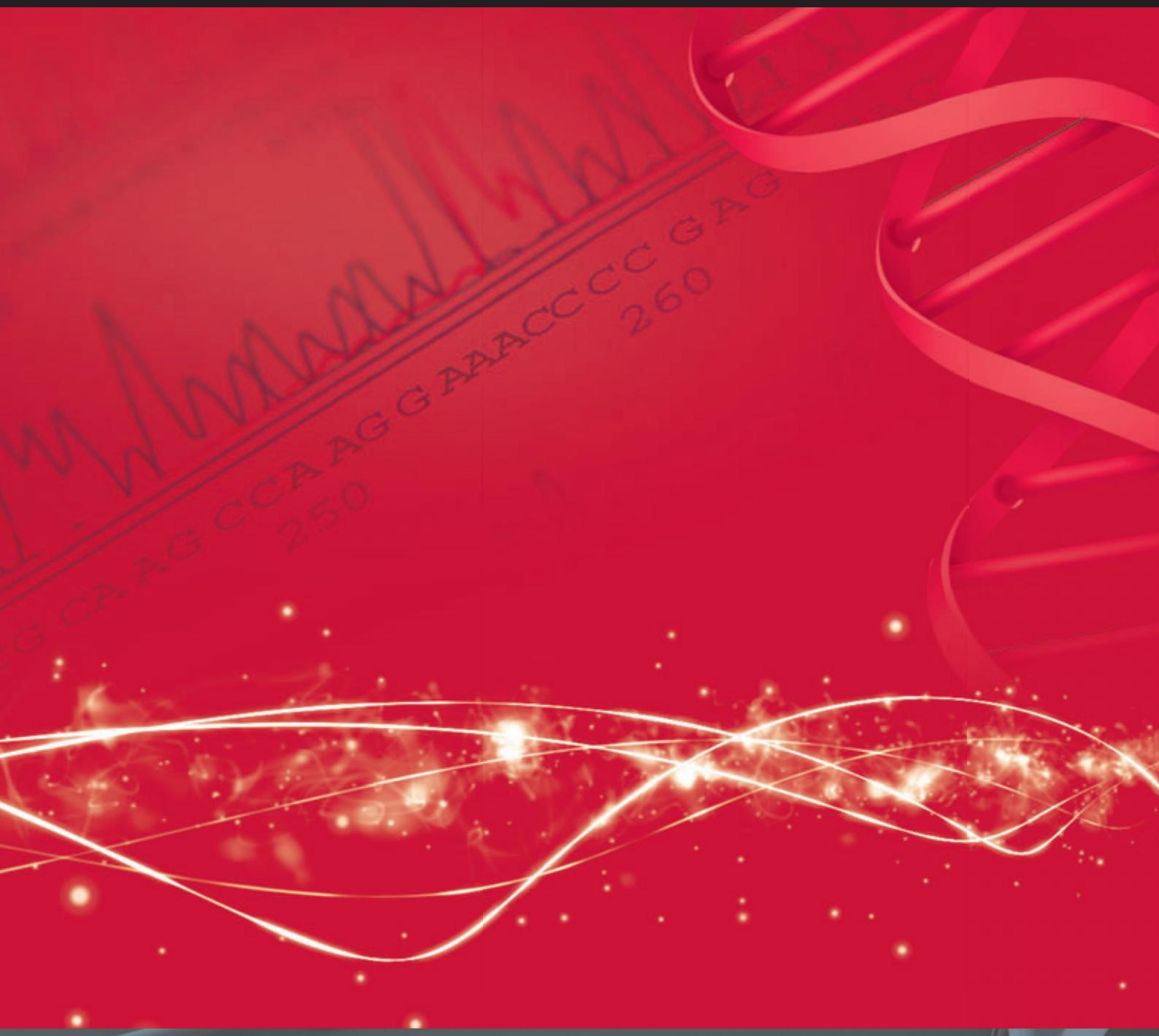


Dynamica

Science Equipment



Spectrophotometer • Thermal Cycler • Microplate Reader • Centrifuge • Gas Chromatograph • pH meter



Introduction

Dynamica is an international company which specializes in the development, production and provision of tools and services for use in life science research, analytical and academic purposes. We market a broad range of products include centrifuges, spectrophotometers, microplate readers, DNA analysers and other laboratory instruments. Based in Zurich, Switzerland, we have regional offices and manufacturing facilities in Europe, Australia and Asia. Together with our distribution partners in many parts of the world, our professional teams support thousands of customers working in healthcare, pharmaceutical, chemical, industrial, quality assurance, academic and government organizations.

We aim to create technological and business advantages for our customers to enable advancement in human health, environmental and resource management, and production efficiency. From product design and research through development to production and distribution, at Dynamica we always strive to deliver practical and innovative solutions with dependable services to each and every customer.



Note: Some products may not be available in certain territories. Please inquire your local distributor for details.

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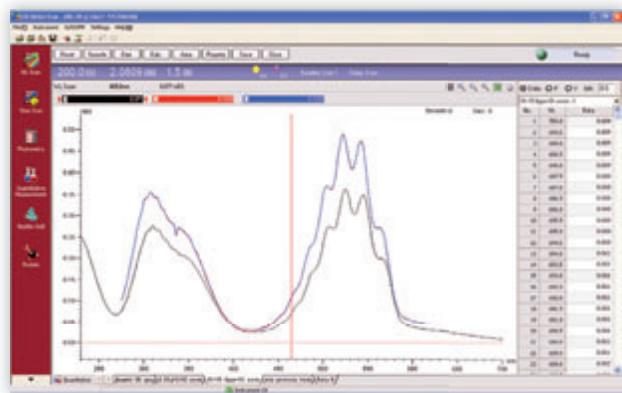
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The Halo Range

UV-Visible and Visible Spectrophotometers

Halo UV Detective Software

UV Detective is powerful, user friendly software specifically designed for the control (and data processing) of selected Halo spectrophotometers from computers installed with the Windows® XP or Windows® 7 operating system. The versatile UV Detective can control all spectrophotometer operations such as photometry, wavelength scans, time scans and more. Further functions include storage of methods programs, saving of numerical and graphical data, downstream data processing, data transfer to commercial spreadsheets such as Microsoft® Excel and report generation.

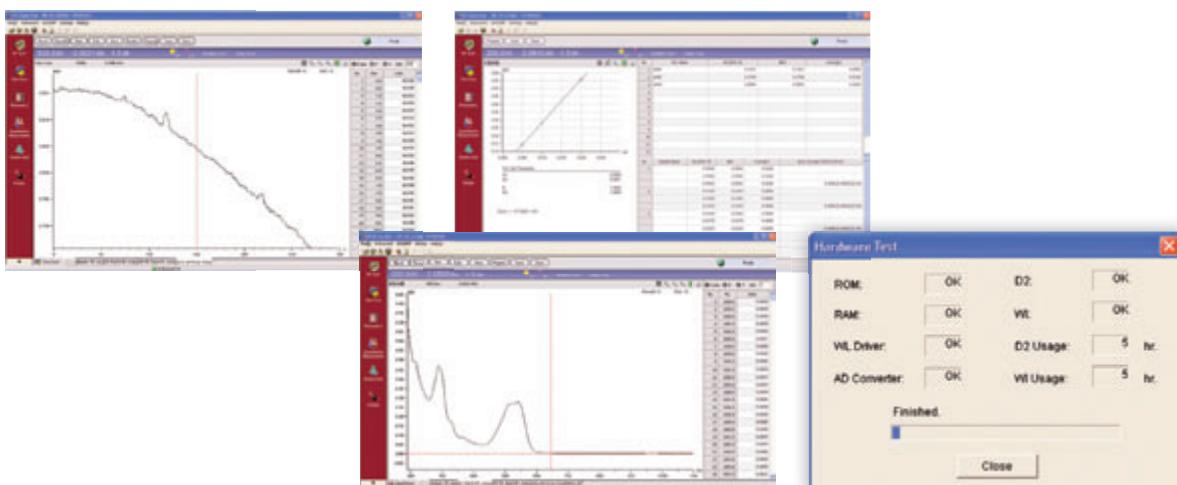


Compatible Spectrophotometers	Halo XB-10, VIS-20, RB-10, DB-20, DB-20S (optional) Halo DB-20R, DB-30 (standard)
Control Functions	Wavelength setting, auto-zero, auto calibration, optical path calibration, accessories such as 6-cuvette positioner and sipper
Measurement Conditions	Start-up, setting, output and storage of measurement parameters
Measurement Function	Wavelength scan, time scan, quantitative analysis, multi-spectrum measurement, kinetic analysis, concentration measurement, nucleic acid / protein measurements
Data Output	Display of spectra, data and scans (time and spectrum)
Quantitative Methods	Multi-wavelength, input of constant, standard curve calibration (linear, quadratic, cubic and segment)
Data Processing	Integral, derivative, flatness, calculation (spectrum and constant), kinetic

Halo UV Detective Software Ordering Information

PRODUCT	CATALOG NUMBER#
UV Detective Software	UVDS-08-01

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Halo XB-10 / VIS-20

UV / Visible and Visible Touch Screen Spectrophotometer



The Halo XB-10 and VIS-20 are high quality, touch screen operation, compact measurement systems for daily analysis in education, quality control and basic research.

Compact Optics with Full Range Scanning

The single beam optics are compact and bench space saving. The long life Xenon lamp optics system in XB-10 ensures a quick and reliable performance, whereas Tungsten Halogen lamp used in VIS-20 also provides a stable measurement.

Color Touch Screen Operation

The intuitive color touch screen operation provides simple access to extensive range of function. The touch screen is sensitive to stylus or gloves on. Icon driven on board software improves accessibility and graphical display allows spectrum or standard curve show on screen. The forward and backward quick key allows user to proceed or return the process swiftly. An enlarged data display for photometry measurement makes result reading easier.

Various Measurement Modes

Operation mode includes photometric, multiple wavelength analysis, spectrum scanning, time scan, kinetics and direct concentration results.

Optional Accessories

Varity choice of accessories included: test tube holder, flow cell with sipper, temperature control holder, long pathlength cuvette holder, multiple cell holder are available to enhance different application needs.

Storage and Data Output

External storage with SD card allows data export to PC compatible text or spreadsheet format. Method and result storage is almost unlimited by exchanging SD card when needed. Printer options are available for direct result printing with graphics. For advanced control, analyses and reporting can be performed by the optional UV Detective software installed on a computer .

Validation Function

To ensure optimum instrument performance, self diagnosis functions are equipped in GLP/GMP wizard for performance validation and auditing.



HALO XB-10 / VIS-20 SPECIFICATIONS	XB-10	VIS-20
Wavelength Range	190 to 1000nm	330 to 1000nm
Resolution	1nm	
Spectral Bandwidth	5nm	8nm
Transmittance accuracy	$\pm 1\% T$	
Transmittance repeatability	0.50%	
Noise	0.004A at 0A at 250nm	
Stray light	<0.5% at 220nm, 340nm, 360nm	
Wavelength accuracy	$\pm 2\text{nm}$	
Wavelength repeatability	1nm	
Absorbance	-0.3 to 1.999	
Transmittance	0 to 199.9%	
Spectrum Scanning	Yes	
Concentration	-300 to 1999	
Selectable Resolution	1, 0.1, 0.01 or 0.001	
Memory	SD card storage	
Quantitation	-300 to 1999	
Time Scan Display	Graphical and calculated concentration value	
Wavelength scan analysis	Absorbance and wavelength of peaks and valleys	
GLP	Clock and calendar Self Diagnosis	

Halo XB-10 / VIS-20 Ordering Information

PRODUCT	CATALOG NUMBER#
Halo XB-10 UV-Visible Single Beam Spectrophotometer 100-230V, 50/60Hz	XB-10
Halo VIS-20 Visible Single Beam Spectrophotometer 100-230V, 50/60Hz	VIS-20
Test Tube Holder	XB-10-TTH
Micro cell holder	XB-10-MCH
Sample Sipper	XB-10-SS
Temperature Control Holder (20- 40°C)	XB-10-TCH
Rectangular Long Pathlength Cuvette Holder	XB-10-RLPH
Manual 5 Cell Changer	XB-10-M5C
Automatic 5 Cell Changer	XB-10-A5C



VIS-10 economy choice for routine test purpose is also available.

Halo RB-10

UV / Visible Ratio Beam Spectrophotometer



The Halo RB-10 is a ratio beam spectrophotometer with an extensive array of built-in functions for versatility and suitability to many analytical and biological applications. The ratio beam optics impart greater accuracy and reproducibility than the conventional, single beam optics.

Ratio Beam Optics

The absorbance signal in conventional single beam instruments can destabilize and result in data inaccuracy. By contrast, ratio beam optics compensate and stabilize signal fluctuations to increase accuracy and reliability even over prolonged usage such as in time course and kinetic measurements. The ratio beam principle involves splitting the beam generated by the light source by a half mirror. One of the split beams passes through the sample and is quantified by a detector whereas the other split beam which is representative of the absorbance signal is measured by an independent detector to obtain a signal reference. The ratio of the values from both detectors is then calculated to detect and compensate for any aberration in the energy of the light source or a temporal change of the optical elements and produce highly stable photometric values.

Spectral Features

Boasting a 2 nm spectral bandpass the Halo RB-10 offers superior spectra and peak resolution.

Other specifications include an impressive wavelength accuracy of $\pm 0.5\text{nm}$, noise level 0.0005Abs (500nm) and stray light $\leq 0.05\%$ (220nm NaI, 340nm NaNO₂).

Built-in and Diverse Range of Measurement Modes

Photometry Mode: Perform quantitative analyses in either absorbance or transmittance modes. Select from single wavelength, up to 6 multiple individual wavelengths, nucleic acid/protein A260/A280 ratios and set up calibration curves with up to 20 standards for concentration measurements.

Time Scan: Perform kinetic measurements for time periods ranging from 1 minute to >27 hours. Measurement intervals are factory preset and automatically selected when the scan time is set.

Wavelength Scan: Perform a full spectral scan from 190 to 1,100nm at any of 8 incremental and preset selectable scan speeds starting from a high resolution 10nm/minute up to a swift 3,600nm /minute. Data is displayed as either numerical values

or a graphical spectrum. Furthermore, perform downstream processing of data, such as peak / valley search or smoothing, directly on board or with the optional Halo UV Detective software.

Dual Lamp Advantage

By virtue of the halogen tungsten and deuterium lamps typically found in higher end analytical spectrophotometers the Halo RB-10 wavelength range is an impressive 190nm – 1,100nm. Furthermore a dual lamp system results in higher accuracy than corresponding xenon lamps. Lamp switching is automatic (by default at 340nm) and both lamps are long life.

User Friendly Operation and Information Rich LCD Display

The 94mm x 70mm, backlit LCD screen with adjustable brightness control is sufficiently large to display a large array of data even in a graphical format. Furthermore, single wavelength absorbance or transmittance data can be enhanced and enlarged using the unique zoom function. The seamless and chemical resistant keypad is designed for easy and quick selection of navigation and function features whilst protecting against any laboratory spills. Other unique features include the 'GO TO WL' short cut key to allow direct input of a new wavelength into an existing measurement.

Validation Functions

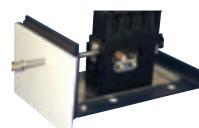
To ensure optimum instrument performance, a self-diagnostic function incorporating a number of parameters is executed each time the Halo RB-10 is switched on. Furthermore, the Halo RB-10 is equipped with a GLP/GMP feature for analyses requiring validation and auditing. Parameters such as wavelength accuracy, wavelength reproducibility, bandpass, baseline flatness, baseline stability and noise level can be all validated and the audit report printed.

Stand Alone or PC Operation

The Halo RB-10 is fully equipped and capable of executing all functions in stand alone mode. Simply connect a standard laser printer for direct printouts of data and graphs. For more advanced analyses and reporting, the simple slide of a switch places the Halo RB-10 under the direct control of the optional UV Detective software installed on a computer with Windows® XP or Windows® 7 operating system.

4-Sample Cuvette Holder

A cuvette holder / changer with a 4-cuvette capacity is supplied as standard. Therefore measurement can be expedited by inserting the 4 cuvettes in tandem and manually sliding the holder / changer forwards or backwards to select the appropriate cuvette for measurement. The cuvette holder / changer is easily removed for cleaning purposes.



Halo RB-10 Accessories

Rectangular Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples



- > Accommodates 4 x long-path cuvettes
- > Accepts cuvettes with 6 optical path lengths of: 10,20, 30, 40, 50 & 100 mm

Thermostatic Cuvette Holder

Designed for applications requiring incubation and/or maintenance of a sample at a constant temperature



- > Water circulation maintains temperature stability
- > Operating temperature range: Room Temperature to +40°C
- > Temperature stability: ±0.3°C
- > Complete with tubing for quick connection to water source (such as circulating water bath)

Test Tube Holder

Designed for the direct measurement of samples in a test tube with no need to transfer to a cuvette



- > Spring mechanism automatically adjusts and accepts test tubes with diameters from 12 - 18 mm
- > High ceiling cover accommodates even the tallest test tubes

Micro-cuvette Holder

Designed for measuring micro-volumes with 50µl micro-cuvette



- > Wavelength range: 220 to 950nm
- > Noise level: ±0.004Abs (with 50µl volumes)

Micro-cuvettes

Suitable for use in the micro-cuvette holder



- > Made from quartz
- > Available size: 50µl

Sample Sipper

Designed for the rapid measurement of multiple samples. Sample is sipped from an external tube directly into the sipper's integrated cuvette and automatically measured. The sample can also be recovered post-measurement.



- > Minimum sample volume: 0.6ml
- > Carryover: ≤1%
- > Sipper cuvette capacity: ~50µl
- > Optical path length: 10mm

HALO RB-10 SPECIFICATIONS

Optics	Concave diffraction grating / Ratio beam Principle
Wavelength Range	190nm -1,100 nm
Spectral Bandwidth	2nm
Stray Light	≤0.05% (220nm NaI, 340nm NaNO ₂)
Wavelength Accuracy	±0.5nm
Photometric Range	Absorbance: -3 to +3 %T: 0% to 300% Concentration: 0,000 to 9,999
Wavelength Scan Speed	10, 100, 200, 400, 800, 1,200, 2,400, 3,600 nm/minute
Baseline Stability	0.001 Abs/hr (500nm, after 2 hours)
Noise Level	0.0005 Abs (500nm)
Light Source	Tungsten-Halogen and Deuterium Lamps
Light Source Switching	Automatic switching at 340nm
Detector	Silicon Photodiode
Display	Back-lit LCD 94(W) x 70(H) mm
Dimensions	370(W) x 550(D) x 265(H) mm
Net Weight	20Kg
Gross Weight	25Kg
Power Requirements	110 - 220 V selectable, 50/60Hz

Halo RB-10 Ordering Information

PRODUCT	CATALOG NUMBER#
Halo RB-10 UV-Visible Ratio Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	RB-10-220
Thermostatic Cuvette Holder with tubing	RB-10-TCH
Test Tube Holder (includes High Ceiling Cover)	RB-10-TTH
Micro-cuvette holder	RB-10-MCH
Micro-cuvettes - quartz 50µl / 10mm optical path length	RB-10-MC-50
Sample Sipper	RB-10-SS
UV Detective Software	UVDS-08-01

Halo DB-20/DB-20S/DB-20R

UV / Visible Double Beam Spectrophotometer



The Halo DB-20 is a high performance double beam spectrophotometer suitable for many analytical applications that a higher level of accuracy is required.

Genuine Double Beam Optics

True double beam optics ensure concurrent measurement of the sample and reference for improved stability, accuracy and reproducibility. The light beam is split in two using a half mirror so that one beam passes through the sample side whilst the other passes through the reference side. Both beams are then measured on individual detectors. The reference side beam also acts to stabilize photometric values in a similar manner to the ratio beam principle.

Spectral Features

Coma aberration elimination from the concave diffraction grating achieves a high resolution 1.5 nm (DB-20S : 1nm) spectral bandpass and certifies compliance of the Halo DB-20 to the stringent European Pharmacopoeia standards.

Other specifications include an impressive wavelength accuracy of $\pm 0.3\text{nm}$, noise level 0.0003Abs (500nm) and stray light $\leq 0.05\%$ (220nm NaI, 340nm NaNO₂).

Built-in and Diverse Range of Measurement Modes

Photometry Mode: Perform quantitative analyses in either absorbance or transmittance modes. Select from single wavelength, up to 6 different individual wavelengths, nucleic acid/protein A260/A280 ratios and set up calibration curves with up to 20 standards for concentration measurements.

Time Scan: Perform kinetic measurements for time periods ranging from 1 minute to >27 hours. Measurement intervals are factory preset and automatically selected when the scan time is set.

Wavelength scan: Perform a full spectral scan from 190 to 1,100nm at any of 8 incremental and preset selectable scan speeds starting from a high resolution 10nm/minute up to a swift 3,600nm /minute. Data is displayed as either numerical values or a graphical spectrum. Furthermore, perform downstream processing of data, such as peak / valley search or smoothing, directly on board or with the optional Halo UV Detective software.

Dual Lamp Advantage

By virtue of the long life, halogen tungsten and deuterium lamps, the Halo DB-20s wavelength range is an extensive 190nm –

1,100nm. Furthermore, the dual lamp system results in higher accuracy than corresponding xenon lamps. Lamp switching is automatic and selectable from a wavelength range of 325nm to 370nm.

User Friendly Operation and Information Rich LCD Display

The extra large 165mm x 122mm, backlit LCD screen with adjustable brightness control displays a large array of data also in graphical format. The seamless and chemical resistant keypad is designed for easy and quick selection of navigation and function features whilst protecting against any laboratory spills. Other unique features include the 'GO TO WL' short cut key to allow direct input of a new wavelength into an existing measurement.

Validation Functions

To ensure optimum instrument performance, self-diagnosis incorporating a number of parameters and wavelength calibration are automatically initiated upon start-up. Furthermore, the Halo DB-20 is equipped with a GLP/GMP feature for analyses requiring validation and auditing. Parameters such as wavelength accuracy, wavelength reproducibility, bandpass, baseline flatness, baseline stability and noise level can be all validated and the audit report printed.

Stand Alone or PC Operation

The Halo DB-20 is fully equipped and capable of executing all functions in stand alone mode. Simply connect a standard laser printer for direct printouts of data and graphs. For more advanced control, analyses and reporting, the simple slide of a switch places the Halo DB-20 under the direct control of the optional UV Detective software installed on a computer with Windows® XP or Windows® 7 operating system.

On-Board Data Storage

Up to 20 operating programs and up to 10 sets of measurement data can be stored in the flash memory of the Halo DB-20. Programs can easily be recalled, edited and deleted. Furthermore, when in stand alone mode, data (in text format) can be downloaded directly to an external memory stick via the USB port and transferred for further processing to any computer loaded with commercial spreadsheets (such as Microsoft® Excel)

PC Control Operation DB-20R

The Halo DB-20R shares the same specification of DB-20S with impressive 1nm bandwidth. DB-20R is PC control only, which the display and USB storage port were replaced by the UV detective software come as standard.



Halo DB-20/DB-20S/DB-20R Accessories

Rectangular Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples

- > Accommodates 2 x long-path cuvettes (sample and reference sides)
- > Accepts cuvettes with 6 optical path lengths of: 10,20, 30, 40, 50 & 100 mm
- > Outer width: 12.5mm



Cylindrical Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples using a cylindrical cuvette

- > Accommodates 2 x long-path cylindrical cuvettes (sample and reference sides)



Thermostatic Cuvette Holder

Designed for applications requiring incubation and/or maintenance of a sample at a constant temperature

- > External water circulation maintains temperature stability
- > Operating temperature range: Room Temperature to +40°C
- > Temperature stability: $\pm 0.3^\circ\text{C}$
- > Complete with tubing for quick connection to water source (such as circulating water bath)



5-Cuvette Holder / Changer

Designed for mounting up to 5 standard 10mm cuvettes on the sample beam side.

- > Total capacity: 5 cuvettes on sample beam side + 1 cuvette on reference beam side)
- > Turret design cuvette holder for efficient changeover
- > Manual change of cuvettes by turning front mounted knob
- > No temperature control



6-Cuvette Holder / Changer (with Electronic Temperature Control)

Designed for mounting up to 6 standard 10mm cuvettes with temperature control and stirring

- > Total capacity: 6 cuvettes on sample beam side + 1 cuvette on reference side)
- > Electronic change over – change cuvettes automatically at defined time intervals
- > Electronic thermostat – set temperature between +20°C to +40°C
- > Includes magnetic stirrer (and fleas)
- > Requires water circulated cooling (tubing included)



Micro-cuvette Holder

Designed for measuring micro-volumes with 50µl micro-cuvette

- > Wavelength range: 220 to 950nm
- > Noise level: ~0.005Abs (with 50µl volumes)



Micro-cuvettes

Suitable for use in the micro-cuvette holder

- > Made from quartz
- > Available size: 50µl



Auto Sample Sipper (without Temperature Control)

Designed for the rapid measurement of multiple or large amounts of sample without the requirement for manual washing or changing of cuvettes. The sample is sipped from an external tube directly into the sipper's integrated cuvette and automatically measured. The sample can also be recovered post-measurement. Two models are available with and without electronic temperature control, the former maintains the flow cuvette section at a constant temperature.



- > Minimum sample volume: 0.7ml
- > Wavelength range: 190nm – 900nm
- > Carryover: ≤ 1
- > Sipper cuvette capacity: ~50µl
- > Optical path length: 10mm.

Auto Sample Sipper (with Temperature Control)

The same features as the Auto sipper with the added convenience of electronic temperature control to maintain the flow cuvette section at a constant temperature.



- > Temperature control range: +20°C to +40°C
- > Requires water circulated cooling (tubing included)

Micro Flow Cuvette Holder

Designed for the continuous measurement of trace samples. The sample can be injected directly into the flow cuvette with a syringe or other injection device.



- > Flow cuvette capacity: 70µl
- > Pressure tolerance: Max. 0.1Mpa
- > Optical path length: 10mm
- > Teflon tubing provided

Glass Sample Holder

Designed for measuring the transmittance / absorbance of glass samples or filters.

- > Glass sample thickness: 0.5mm to 5mm
- > Glass sample dimensions: Min. 12x25mm to Max. 55x100mm



Film Sample Holder

Designed for measuring the transmittance to absorbance of thin film-like samples.



- > Film sample dimensions: 25m (W), 30 to 50mm (H)
- > Beam aperture: 10mm(W) x 20mm (H)

HALO DB-20 / DB-20S / DB-20R SPECIFICATIONS	DB-20	DB-20S	DB-20R
Optics	Concave diffraction grating / Double Beam Principle		
Wavelength Range		190nm -1,100 nm	
Spectral Bandwidth	1.5 nm		1.0 nm
Stray Light	≤0.05% (220nm NaI, 340nm NaNO ₂)		≤0.10% (220nm NaI, 340nm NaNO ₂)
Wavelength Accuracy		±0.3nm	
Photometric Range		Absorbance: -3 to +3 %T: 0% to 300%T Concentration: 0,000 to 9,999	
Wavelength Scan Speed	10, 100, 200, 400, 800, 1,200, 2,400, 3,600 nm/minute		
Baseline Stability	0.0003 Abs/hr (500nm, after 2 hours)		
Noise Level	0.0003 Abs (500nm)		
Light Source	Tungsten-Halogen and Deuterium Lamps		
Light Source Switching	Automatic switching selectable from 325nm to 370nm		
Detector	Silicon Photodiode		
Display	Back-lit LCD 165(W) x 122(H) mm		N/A
Dimensions	505(W) x 590(D) x 265(H) mm		
Net Weight	29Kg		
Gross Weight	35Kg		
Power Requirements	110 - 220 V selectable, 50/60Hz		

Halo DB-20/DB-20S/DB-20R Ordering Information

PRODUCT	CATALOG NUMBER#
Halo DB-20 UV-Visible Double Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	DB-20-220
Halo DB-20S UV-Visible Double Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	DB-20S-220
Halo DB-20R UV-Visible Double Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	DB-20R-220
Rectangular Long-Path Cuvette Holder	DB-20-RLPH
Cylindrical Long-Path Cuvette Holder	DB-20-CLPH
Thermostatic Cuvette Holder (includes tubing)	DB-20-TCH
Manual 5-Cuvette Holder/Changer	DB-20-FCC
Auto 6-Cuvette Holder/Changer with temperature control and stirrer	DB-20-SCCT
Auto 6-Cuvette Holder/Changer without temperature control and stirrer	DB-20-SCC
Micro-cuvette Holder*	DB-20-MCH
Micro-cuvette - quartz: 50µl / 10mm optical path length*	MC-50
Auto Sample Sipper with temperature control*	DB-20-SST
Auto Sample Sipper without temperature control*	DB-20-SS
Micro Flow Cuvette Holder*	DB-20-MFH
Glass Sample Holder	DB-20-GSH
Film Sample Holder	DB-20-FSH
UV Detective Software	UVDS-08-01

Note : * Not Applicable for Halo DB-20S & DB-20R

Halo DB-30

UV / Visible Double Beam Spectrophotometer



The next generation Halo DB-30 double beam spectrophotometer boasts superlative performance characteristics for applications demanding the utmost sensitivity by combining higher signal to noise ratios with minimal stray light. This warrants the Halo DB-30 suitable to many diverse fields and industries such as pharmaceutical, food, sanitation, environment, biology, agriculture, geology, mineral, petrochemical, optical, life science, education, manufacturing and many others.

Exceptionally Low Stray Light

The intricate but elegant and innovative optical pathway is engineered to deliver outstanding double beam performance characteristics, in particular stray light which achieves an impressive low 0.010%T. The outcome is an increase in the linearity of absorbance characteristics for most samples thus increasing the scope of analytical applications particularly at higher concentrations.

Spectral Features

The asymmetric monochromator with long focal length results in improved sensitivity. Furthermore, up to 6 slit widths are selectable and switchable (with the highest achievable resolution of 0.1 nm) thus allowing for the optimization of different applications.

Other specifications include an impressive wavelength accuracy of $\pm 0.3\text{nm}$, noise level 0.0003Abs (500nm), wavelength repeatability of $\pm 0.1\text{nm}$ for the accuracy and reproducibility of analytical data and an absorbance range of -4 to +5 Abs for the analysis of high absorbance samples without the need for further dilution.

High Scan Speeds and Resolution

Select from 8 scan speeds starting at a high resolving 1nm/min. Coupled with the precise fine tuning of the photomultiplier tubes, a wavelength resolution of 0.1nm is maintained even at the fastest scan speed of 2,000 nm/min.

Powerful UV Detective PC Control

The Halo DB-30 is PC controlled using the UV Detective software (included with the instrument). Refer to page 3 for further details on the UV Detective software. UV Detective can also operate optional accessories such as the sample sipper and 6-cuvette holder.

The UV Detective software is powerful but user friendly using Windows® XP or Windows® 7, as depicted in the process flow below

- > Select Function (e.g. Photometry)
- > Set Method Parameters
- > Auto-zero or Baseline
- > Sample test
- > Data processing
- > Report Generation

Dual Lamp Advantage

By virtue of the long life, halogen tungsten and deuterium lamps, the Halo DB-30's wavelength range extends from 190nm – 900nm. Furthermore, the dual lamp system results in higher accuracy than corresponding xenon lamps. Lamp switching is automatic and selectable from a wavelength range of 325nm to 370nm.

Validation Functions

To ensure optimum instrument performance, self-diagnosis incorporating a number of parameters and wavelength calibration are automatically initiated upon start-up. Furthermore the Halo DB-30 and the UV Detective software is equipped with a GLP/GMP feature for analyses requiring validation and auditing. Parameters such as wavelength accuracy, wavelength reproducibility, bandpass, baseline flatness, baseline stability and noise level can be all validated and the audit report printed.

Halo DB-30 Accessories

Rectangular Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples

- > Accommodates 2 x long-path cuvettes (sample and reference sides)
- > Accepts cuvettes with 6 optical path lengths of: 10,20, 30, 40, 50 & 100 mm



Cylindrical Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples using a cylindrical cuvette

- > Accommodates 2 x long-path cylindrical cuvettes (sample and reference sides)



Thermostatic Cuvette Holder

Designed for applications requiring incubation and/or maintenance of a sample at a constant temperature

- > External water circulation maintains temperature stability
- > Operating temperature range: Room Temperature to +40°C
- > Temperature stability: $\pm 0.3^\circ\text{C}$
- > Complete with tubing for quick connection to water source (such as circulating water bath)



5-Cuvette Holder / Changer

Designed for mounting up to 5 standard 10mm cuvettes on the sample beam side.

- > Total capacity: 5 cuvettes on sample beam side + 1 cuvette on reference beam side
- > Turret design cuvette holder for efficient changeover
- > Manual change of cuvettes by turning front mounted knob - no temperature control



6-Cuvette Holder / Changer (with Electronic Temperature Control)

Designed for mounting up to 6 standard 10mm cuvettes with temperature control and stirring

- > Total capacity: 6 cuvettes on sample beam side + 1 cuvette on reference side
- > Electronic change over – change cuvettes automatically at defined time intervals
- > Electronic thermostat – set temperature between +20°C to +40°C
- > Includes magnetic stirrer (and fleas)
- > Requires water circulated cooling (tubing included)



6-Cuvette Holder / Changer (without Electronic Temperature Control)

Designed for mounting up to 6 standard 10mm cuvettes without temperature control and stirring

- > Total capacity: 6 cuvettes on sample beam side + 1 cuvette on reference side
- > Electronic change over – change cuvettes automatically at defined time intervals



Micro-cuvette Holder

Designed for measuring micro-volumes with 50µl micro-cuvette

- > Wavelength range: 220 to 880nm
- > Noise level: ~0.001Abs (with 50µl volumes)



Micro-cuvettes

Suitable for use in the micro-cuvette holder

- > Made from quartz
- > Available size: 50µl



Auto Sample Sipper (without Temperature Control)

Designed for the rapid measurement of multiple or large amounts of sample without the requirement for manual washing or changing of cuvettes. The sample is sipped from an external tube directly into the sipper's integrated cuvette and automatically measured. The sample can also be recovered post-measurement.



Two models are available with and without electronic temperature control, the former maintains the flow cuvette section at a constant temperature.

- > Minimum sample volume: 0.7ml
- > Wavelength range: 190nm – 900nm
- > Carryover: $\leq 1\%$
- > Sipper cuvette capacity: ~50µl
- > Optical path length: 10mm

Auto Sample Sipper (with Temperature Control)

The same features as the Auto sipper with the added convenience of electronic temperature control to maintain the flow cuvette section at a constant temperature.



- > Temperature control range: +20°C to +40°C
- > Requires water circulated cooling (tubing included)

Micro Flow Cuvette Holder

Designed for the continuous measurement of trace samples. The sample can be injected directly into the flow cuvette with a syringe or other injection device.



- > Flow cuvette capacity: 70 μ l
- > Pressure tolerance: Max. 0.1Mpa
- > Optical path length: 10mm
- > Teflon tubing provided

Glass Sample Holder

Designed for measuring the transmittance / absorbance of glass samples or filters.



- > Glass sample thickness: 0.5mm to 5mm
- > Glass sample dimensions: Min. 12x25mm to Max. 55x100mm

Film Sample Holder

Designed for measuring the transmittance / absorbance of thin film-like samples.



- > Film sample dimensions: 25mm (W). 30 to 50mm (H)
- > Beam aperture: 10mm(W) x 20mm (H)

HALO DB-30 SPECIFICATIONS	
Optics	Diffraction grating / Double Beam
Wavelength Range	190nm - 900nm
Spectral Bandwidth	Selectable: 0.1nm, 0.2nm, 0.5nm, 1.0nm, 2.0nm, 5.0nm
Stray Light	$\leq 0.010\% T$ (220nm NaI, 340nm NaNO ₂)
Wavelength Accuracy	$\pm 0.3\text{nm}$
Wavelength Repeatability	$\pm 0.1\text{nm}$
Setting Wavelength	0.01nm increments
Photometric Accuracy (NIST 930D filter)	$\pm 0.002\text{Abs}$ (0~0.5Abs) $\pm 0.004\text{Abs}$ (0.5~1Abs) $\pm 0.008\text{Abs}$ (1~2Abs) $\pm 0.3\% T$
Photometric Repeatability (NIST 930D filter)	$\pm 0.001\text{Abs}$ (0~0.5Abs) $\pm 0.002\text{Abs}$ (0.5~1Abs) $\pm 0.004\text{Abs}$ (1~2Abs) $\pm 0.15\% T$
Measurement Modes	Abs, %T, Conc. E(S), E(R) Absorbance: -4 to +5
Photometric Range	%T: 0% to 600%T Conc: -9,999 ~ +9,999 E(S), E(R): 0 ~ 600
Wavelength Scan Speed	Selectable: 1; 5; 20; 120; 300; 1,000; 1,600; 2,000 nm/minute
Wavelength Slew Speed	3,000nm/min.
Baseline Flatness	$\pm 0.001\text{Abs}$ (200~850 nm)
Baseline Stability	0.0004 Abs/hr (500nm, after 2 hours)
Noise Level	$\pm 0.0003\text{ Abs}$ (500nm)
Light Source	Tungsten-Halogen and Deuterium Lamps
Light Source Switching	Automatic switching, selectable from 325nm to 370nm
Detector	Photomultiplier
Instrument Control	PC with Windows® XP or Windows® 7 operating system
Dimensions	710(W) x 630(D) x 268(H) mm
Net Weight	50Kg
Gross Weight	56Kg
Power Requirements	110-220V AC (50/60Hz), 300VA

Halo DB-30 Ordering Information

PRODUCT	CATALOG NUMBER#
Halo DB-30 UV-Visible Double Beam Spectrophotometer 220V AC, 50/60Hz with UV Detective Software	DB-30-220
Rectangular Long-Path Cuvette Holder	DB-30-RLPH
Cylindrical Long-Path Cuvette Holder	DB-30-CLPH
Thermostatic Cuvette Holder (includes tubing)	DB-30-TCH
Manual 5-Cuvette Holder/Changer	DB-30-FCC
Auto 6-Cuvette Holder/Changer with temperature control and stirrer	DB-30-SCCT
Auto 6-Cuvette Holder/Changer without temperature control and stirrer	DB-30-SCC
Micro-cuvette Holder	DB-30-MCH
Micro-cuvette - quartz: 50 μl / 10mm optical path length	MC-50
Auto Sample Sipper with temperature control	DB-30-SST
Auto Sample Sipper without temperature control	DB-30-SS
Micro Flow Cuvette Holder	DB-30-MFH
Glass Sample Holder	DB-30-GSH
Film Sample Holder	DB-30-FSH

Halo DNAmaster

Microvolume Nucleic Acids And Proteins Measurement



The Halo DNAmaster complements the existing range of Halo spectrophotometers and plate readers. It is designed for the measurement and analysis of precious samples by requiring only microvolume quantities. Naturally, DNAmaster features the same ruggedness, reliability, precision and reproducibility synonymous with the Halo family.

The Halo DNAmaster is equipped with a comprehensive selection of on-board functions for versatility and suitability to many life science applications involving nucleic acid, proteins and bacterial cultures.

Spectral Features

The Halo DNAmaster boasts a wavelength range from 200 to 900nm, an absorbance range between 0 - 4 O.D. and a wavelength accuracy of 1nm. Low noise (~0.005 O.D.) combined with a photometric accuracy of ± 0.01 O.D. and 4nm bandwidth ensure excellent sensitivity, accuracy and reproducibility.

Minimal Volume for Precious Samples

By virtue of the innovative 'Ultramicro' cell as little as 0.5 μ l of sample is required (optional cap is needed). Simply pipette the sample on the appropriate section of the Ultramicro cell, perform the measurement and then wipe off or aspirate the sample for further downstream applications.

The Halo DNAmaster can also be used as a conventional spectrophotometer with standard 10mm optical path length cuvettes.

If microvolume measurement is not a must, the Halo DNAmaster is also available configured with 50 μ l cells. However, both configurations can also be used as a conventional spectrophotometer with standard 10mm optical path length cuvettes.



User Friendly Operation and Information Rich LCD Display

The 90mm x 120 mm, colour LCD screen is touch sensitive with intuitively designed software for quick selection by sample type. Effortless step by step navigation and a virtual QWERTY keyboard provide fast and efficient input and analysis. Data is displayed numerically and also in a graphical format (where applicable) with the further option of direct printing or storage in a SD card. Master Report PC software is available for convert the settings and results in a report format (Microsoft® Excel is required).

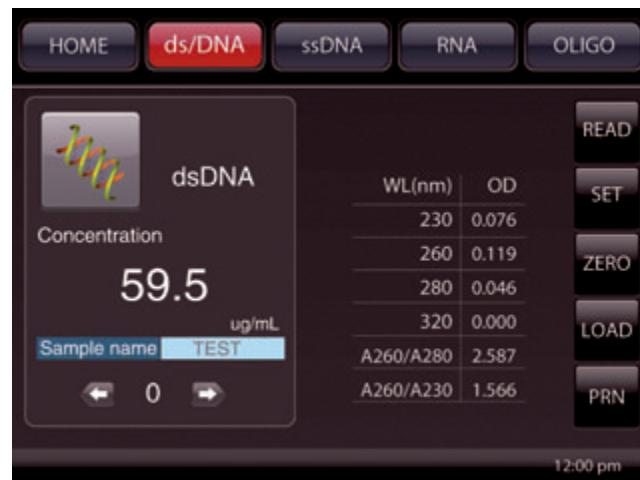


Nucleic Acid Analysis

The Halo DNAmaster is configured with onboard functions for the quantification of nucleic acids. Select the nucleic acid of choice such as double stranded DNA, single stranded DNA, RNA or oligonucleotides and absorbance measurements at the prescribed wavelength are directly converted into concentration units. The detection limit of the Halo DNAmaster is 6ng/ μ l (double stranded DNA), with optional 2mm cap of ultramicro cell.

The purity of nucleic acids can also be determined from ratio calculations such as A260 / A280 nm for protein contamination of DNA preparations.

Furthermore, The Halo DNAmaster can measure concentrations DNA, RNA and oligonucleotide – dye complexes.



Protein Analysis

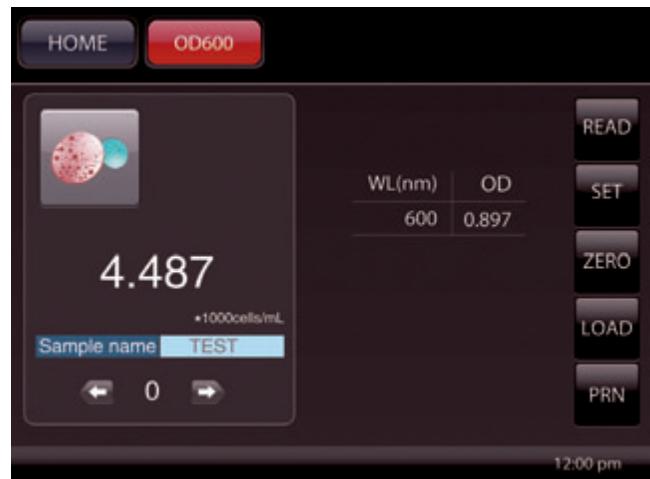
The Halo DNAmaster measures protein concentrations from a range of colourimetric assays such as Bradford, Lowry, Biuret and BCA. In addition to numerical data the standard calibration curve can be displayed.

Furthermore, measure protein alone at 280nm or protein-dye complexes that absorb at different wavelength.



Cell Culture Optical Density

The Halo DNAmaster also measures bacterial cell density at 600nm. Absorbance readings of approximately 0.4units define a bacterial culture in exponential growth phase and at the most appropriate for harvest or induction.



Conventional Spectrophotometry

At the touch of the screen the Halo DNAmaster converts into a conventional spectrophotometer for use with either the Ultramicro cell or a standard 10mm optical path length quartz or glass cuvette. It can perform single wavelength photometry in either absorbance or % transmittance mode including multiple wavelength photometry for up to 6 user defined wavelengths in absorbance mode.

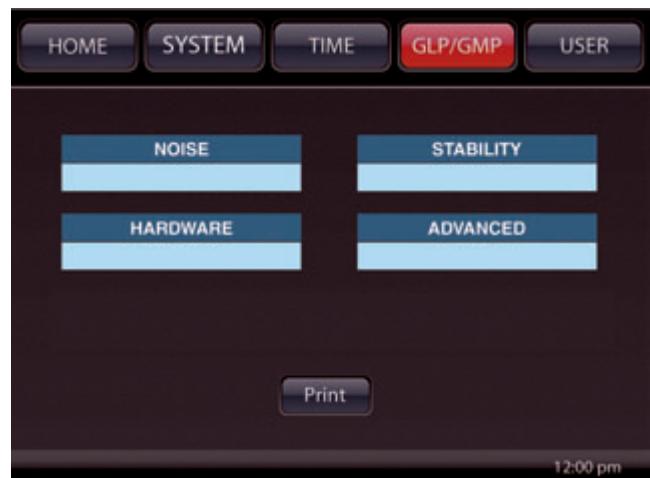
Other functions include wavelength scans, time scans for kinetic studies and concentration calculations from standard curves.



Validation Functions

To ensure optimum instrument performance, a self-diagnostic function incorporating a number of parameters is executed each time the Halo DNAmaster is switched on including a selectable GLP/GMP function.

(Validation kit is required in some parameter.)



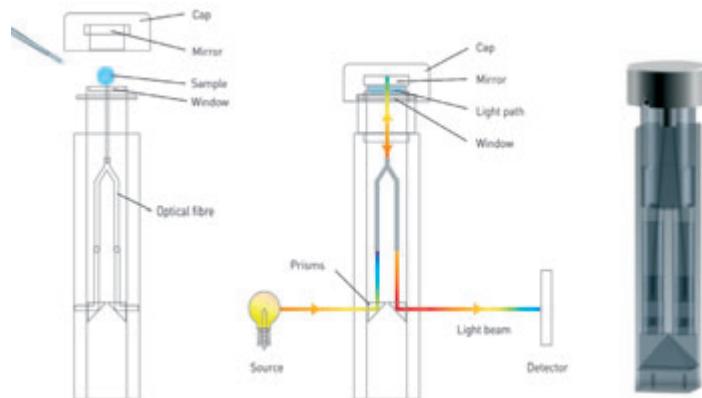
Thoughtful Design

Dynamica considered every detail in the design of Halo DNAmaster, for example, the cuvette holder can be removed for washing and it is autoclavable for decontamination. Furthermore, a cover protects both the cuvette holder and the detector from dust and dirt when the unit is not in use. The side mounted cuvette rack is detachable for easy cleaning and a smaller footprint if bench space is at a premium.



Ultramicro Cell

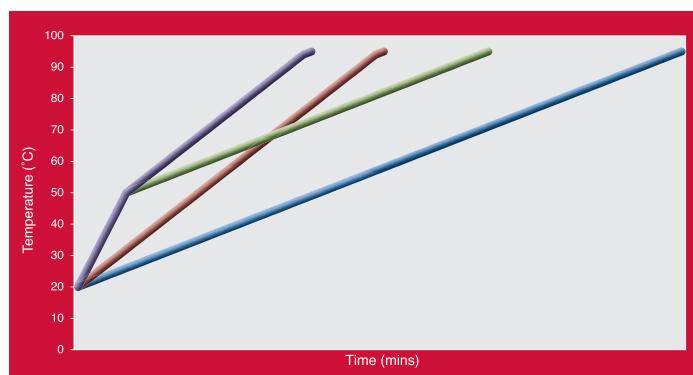
The Ultramicro cell utilises fibre-optic technology and is designed for measurement and analysis of extremely small volumes of DNA/RNA samples with high accuracy and outstanding reproducibility. In applications involving very high or very low DNA concentrations, a single light path is often insufficient, however the interchangeable cap of the Ultramicro cell imparts light paths of 1 mm and 0.2 mm respectively and effectively creates virtual dilutions to overcome such situations. Other pathlengths are available for different volume and concentration limit. A further function of the cap is to prevent the sample from drying up and to ensure that measurements remain reproducible since sample characteristics can be affected by evaporation of the solvent.



Programmable Temperature Control Model

The DNAmaster temperature control model utilizes a peltier regulated cell holder to control the sample temperature from a range of +20°C to +95°C (with $\pm 0.5^\circ\text{C}$ precision). Predominantly designed for the determination of nucleic acid Tm (at 260nm) up to 4 heating profiles can be selected, including 1°C/min, 2°C/min or a quick heat mode for heating up to a plateau temperature of 50°C at 5°C/min before ramping commences at 1°C/min or 2°C/min.

The heated cell holder can also be used in other applications requiring incubation and/or keeping a sample at a constant temperature for example during kinetic analyses.



DNAMASTER SPECIFICATIONS	
Lamp Source	Long Life Xenon Flash Lamp
Detector Device	2048 pixel CCD
Wavelength Range	200-900nm
Measuring Range	0-4.0 OD
Wavelength Accuracy	+/-1nm
Bandwidth	4nm
Noise	~0.005 OD (RMS)
Drift	~0.005 OD
Photometric Accuracy	+/-0.01 OD
Photometric Repeatability	+/-0.005 OD
Stray Light	0.5%T
Ultramicro Cell dsDNA Detection Limit (Depends on the Cap Used)	13ng/µl (Standard cap) 6ng/µl (Optional cap)
Ultramicro Cell Minimum Sample Volume (Depends on the Cap Used)	0.7µl (Standard cap) 0.5µl (Optional cap)
Start Up Melodies	Selectable from 7 types and mute
Energy Saving Mode	Yes
Memory Storage	Internal or SD card
Result Storage	40,000 (internal) Unlimited (SD Card)
User Defined Program Storage	10 for each function
Dimension W x D x H (mm)	300 x 300 x 115 300 x 300 x 155 (TC model)
Weight (kg)	3.5kg 4.5kg (TC model)
Power Requirement	110 - 220 V, 50/60Hz

Quantification of dsDNA with Different Ultramicro Cell Cap

	Factor	2 mm cap	1 mm cap	0.2 mm cap	0.1 mm cap	Total Detection Range
dsDNA [ng/µl]	50	6 - 425	13 - 850	63 - 4250	125 - 8500	6 - 8500
Required Sample Volume		6 - 10 µl	3 - 5 µl	0.7 to 4 µl	0.5 to 3 µl	

Halo DNAmaster Ordering Information

PRODUCT	CATALOG NUMBER#
Halo DNAmaster 200nm-900nm with 50µl microvolume cell	DNAM
Halo DNAmaster 200nm-900nm with ultramicro cell (0.2mm & 1mm cap included)	DNAM-UM
Halo DNAmaster 200nm-900nm temperature control model	DNAM-TC
Compact thermal printer for DNAmaster	DNAM-PRINT
Ultramicrocell with 1mm and 0.2mm cap	ULTRACELL
2mm cap for DNAmaster ultramicro cell	2MM CAP
1mm cap for DNAmaster ultramicro cell	1MM CAP
0.2mm cap for DNAmaster ultramicro cell	0.2MM CAP
0.1mm cap for DNAmaster ultramicro cell	0.1MM CAP

Halo LED 96

Microplate Reader



HALO LED 96 is a computer controlled microplate reader for 96 well plates. Easy and safe operation removes the hassle from your daily microplate reading jobs. It is based on the most modern LED technology, no need to worry about lamp replacements anymore.

LED Technology

Instead of lamps and filters, HALO LED 96 is supplied with up to 6 intelligent, wavelength specific LED-plugins (patent pending). Each plugin contains its own digital ID, LED-light source, filter and lenses in one easily exchangeable component.

Low Power Consumption

In times like these, low power consumption must be a key issue with any electrical devices. With a maximum consumption of 12W during reading and a standby consumption of not more than 2W, HALO LED 96 again is setting new standards.

Unrivaled Optical Performance

Using LED's as light source moves all those known problems with halogen lamps used in other readers to history. Modern LED's are known for their high and extremely stable light energy paired with very low energy consumption and no heat development.

Intelligent LED Plugins

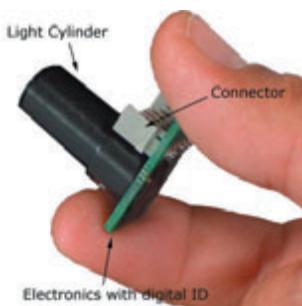
Adding new wavelengths (e.g. 340nm) or exchanging existing ones is as easy and safe as 1-2-3. Auto-recognition of the individual plugins takes away the worry about filter positions in the reader.

Computer Controlled

HALO LED 96 is fully computer control-led. **Capture 96** (included) allows plate reading and collecting the raw OD data from the reader. With its clipboard function, it allows raw data to be pasted into any spreadsheet program for further calculations.

MikroWin2010 Compliant

In combination with MikroWin2010 data reduction software (optional), HALO LED 96 adapts itself to any of your requirements for microplate based assays. Depending on your package selection, MikroWin2010 is the best choice for routine applications as well as extended screening, curvefit and kinetic studies.



HALO LED 96 SPECIFICATIONS	
Plate Types	96 well
Optical system	8 channel Transmission Photometer
Light source	Digital controlled LED lamps, wavelength specific
Photodetector	8 silicon Photodiodes
Wavelength range	340 - 750nm (special wavelengths up to 900nm)
Resolution	0.1 mOD (0.0001 OD)
Indication range	0.000 - 4.000 OD (Abs)
Accuracy	better than $\pm 1\%$ and ± 0.005 OD up to 2.5 OD (any wavelength) $\leq \pm 0.5\%$ and ± 0.005 OD from 0.1 to 1.5 OD (any wavelength) $\leq \pm 0.75\%$ from 1.5 to 2.5 OD (400nm – 750nm) $\leq \pm 0.75\%$ and ± 0.005 OD from 0.1 to 2 OD (340 - 400 nm)
Linearity	better than $\leq \pm 0.3\%$ at 1OD (any wavelength) better than $\leq \pm 0.5\%$ at 2OD (400-750nm)
Reproducibility	better than $\leq \pm 0.3\%$ at 10D (any wavelength)
Measurement Mode	Single and dual wavelength Linear scan (30 points/well) for agglutination etc.
Reading speed	5 seconds (kinetic interval, single wavelength) 10 seconds (96 well, dual wavelength)
Wavelengths	4 wavelengths onboard (405, 450, 492, 620nm) up to 6 possible (340 - 750)
Shaking	4 speeds
PC-Interface	USB 2.0 (USB 1.1 compatible)
PC Software	Capture96 included MikroWin2010 demo version included
Dimensions	23cm x 12cm x 36cm (W x H x L)
Weight	6.7 kg net
Housing	Anodized Aluminium
Power Supply	external power adapter 100-240V, 50 or 60 Hz (autosensing), 24VDC, 2.5A (approved to EN 60601-1-2, EN 61000-6-3, EN 61000-6-1, EN 60601-1, EN 60950)
Scope of Supply	Power adapter, USB Cable, 4 Standard Filters, User manual (CD), Capture96 Control Software, MikroWin2010 Connect (demo version)

Halo LED 96 Ordering Information

PRODUCT	CATALOG NUMBER#
HALO LED 96 Microplate Reader	WR-302-02
LED plugin (xxx = wavelength in nm)	WR-302-xxx
MikroWin2010 Lite (Screening & Curve Fit, basic functions)	WR-302-03
Mikrowin2010 Full Version 1 (Screening & Curve Fit, extended functions)	WR-302-04
Mikrowin2010 Full Version 2 (Screening & Curve Fit & Kinetic, extended functions)	WR-302-05

For more information on MikroWin2010 and its features, please visit www.mikrotek.de

Halo MPR-96

Visible Microplate Reader



The MPR-96 Microplate Reader extends the Halo range to facilitate higher throughput analyses of experiments consisting of an array of micro-volume reactions typically in a 96 well plate format. Naturally the MPR-96 features the same ruggedness, reliability, precision and reproducibility synonymous with the Halo family.

The Halo MPR-96 also comes standard with a comprehensive selection of on-board functions for versatility and suitability to many analytical and biological applications. Use either in stand alone mode or connect to a PC to maximize flexibility.

Superior Performance

The Halo MPR-96 boasts a market leading absorbance range between 0 - 4 OD which is further complemented by linearity of $\pm 1\%$ up to 2.5 OD (405nm). The excellent measurement uniformity across all wells is matched by an intra- and inter-plate variation of ± 0.010 OD (405nm, 0-2 OD) for maximum accuracy and reproducibility.

Other specifications include 8 measurement channels and 1 reference channel to expedite processing coupled with a swift read time of 10 seconds per 96 wells thus ensuring reliable data during kinetic analyses.

An optional calibration plate can also be employed to certify various regulatory compliances or validate other practices such as precision assurance.

Exceptional Wavelength Range

The flexible filter based system allows for measurements within a spectrum range from 400nm through to a maximum of 750nm. Model MPR-96UV extends the measurement to 340nm UV range.

Additionally, the large selection of interference filters caters for the most common and critical wavelengths. Up to 5 interference filters can be mounted on the carousel which is easily accessible for effortless and quick replacement of filters if the need arises.

Versatile by Nature

The exceptional capability of the Halo MPR-96 imparts the flexibility to perform the simplest of functions such as the generation of raw data and qualitative evaluations through to more complex functions involving kinetics and curve fits (select from linear, point to point, quadric, cubic or logistic types).

The Halo MPR-96 accepts 96 well microplates in flat bottom as well as U and V shaped configurations. The unit can also be automated for high throughput by integrating compatible robotic handling systems.

Diverse Range of Measurement Modes

Select from 'Fast' mode when quick measurement is required (for example screening applications) to 'Accurate' mode when high resolution is necessary.

Other modes include:

- > 'Centre Measurement' to detect small samples with a non-linear surface.
- > Single or dual wavelengths.
- > Plate shaking (4 speeds, linear motion) before measurement or in-between cycles (for example during kinetic analyses).

User Friendly Operation and Information Rich LCD Display

The 90mm x 68mm, backlit LCD screen with adjustable brightness control is sufficiently large to display a comprehensive array of data even in a graphical format, for example up to 48 wells i.e. half of a 96 well plate can be displayed concurrently with the added capability to zoom in on specific data points. Other displayed parameters in addition to measurement results include operation prompts, plate layout and historical data.

The seamless and chemical resistant keypad is designed for easy and quick selection of the navigation and function features when in stand alone mode whilst simultaneously protecting against any laboratory spills.

Validation Functions

To ensure optimum instrument performance, a self-diagnostic function incorporating a number of parameters is executed each time the Halo MPR-96 is switched on.

Stand Alone or PC Operation

The Halo MPR-96 is fully equipped and capable of executing all functions in stand alone mode. Simply connect a compatible printer to the USB port for the direct printout of plate data, reports and graphs (please visit our website for updated list of printers). For more advanced functions, analyses and reporting, the Halo MPR-96 can also be connected via USB ports to a PC (preferred with Windows® XP™ Pro or above operating system) for direct control with the optional software.

On-Board Storage Data

The Halo MPR-96 (in stand alone mode) boasts on-board flash memory for the storage of up to 30 test programs and up to 50 sets of plate measurement data. Programs and measurement data can easily be recalled, edited and deleted. Furthermore, plate measurement data can be readily downloaded to USB2.0 supported external memory devices (for example memory sticks or external hard-disks) for transfer and further processing to a computer supporting commercial spreadsheets (such as Microsoft® Excel™).

Temperature Control

The optional peltier regulated module allows for temperature control within a range of ambient +4°C to +50°C ($\pm 0.5^\circ\text{C}$ precision) with excellent temperature uniformity among wells and is suitable for applications requiring incubation and/or maintenance of a sample at a constant temperature for example during kinetic analyses.,

Other Features

The microplate tray smoothly and effortlessly slides out and slides in to facilitate the loading and measurement of microplates. The durable motor ensures consistent and long-lasting operation. The microplate tray can be operated in both stand alone and PC control modes.

The halogen lamp features long life stability and can also be easily accessed and changed within minutes.

MikroWin2010 Compliant

MPR-96 extends the data analysis function to computer with the optional MikroWin2010 data reduction software. With different package selection, MikroWin2010 fits for routine applications as well as extended screening, curvefit and kinetic studies.

HALO MPR-96 SPECIFICATIONS

Wavelength Range	400nm - 750nm (340-750nm for MPR-96 UV)
Photometric Range	Absorbance: 0 to +4.0 OD
Resolution	0.001 OD
Stability	±0.001 OD (15 minutes after start up)
Accuracy	Better than ±1.0% ±0.01 OD (405nm, 0.000 – 2.500 OD) Better than ±2.0% ±0.01 OD (405nm, 2.500 – 3.000 OD)
Repeatability	Better than ±0.5% ±0.005 OD (405nm, 0.000 – 2.500 OD) Better than ±1.5% ±0.005 OD (405nm, 2.500 – 3.000 OD)
Linearity	Better than ±1.0% (405nm, 0.000 – 2.500 OD) Better than ±2.0% (405nm, 2.500 – 3.000 OD)
Filter Capacity	5 position [4 standard (405nm, 450nm, 492nm, 620nm) + 1 optional (between 400nm to 750nm)] (UV model with 340nm as standard)
Reading Speed	Single wavelength, fast mode, 96 well: ≤10 seconds Dual wavelength, fast mode, 96 well: ≤15 seconds
Plate Types	96 well with flat, U or V shape bottom
Optical System	8 measurement channels, 1 reference channel
Detector	Silicon Photodiodes
Light Source	Halogen (WL) Lamp
Display	Back-lit LCD 90(W) x 68(H) mm: Resolution 320x240 pixels.
Shaking	Linear, 4 speed selectable
Temperature Control (optional)	Ambient +4°C to +50°C
Temperature Accuracy (optional)	±0.5°C
Printer Interface Connection	USB interface
Printer Language	Support PCL - 5 or above
External Storage	USB flash drive
Dimensions	290(W) x 425(D) x 200(H) mm
Net Weight	15Kg
Gross Weight	20Kg
Power Requirements	110 - 220 V auto switching, 50/60Hz
Power Consumption	50W (standby), 100W (operation)

Halo MPR-96 Ordering Information

PRODUCT	CATALOG NUMBER
Halo MPR-96 Visible Microplate Reader 400-700nm	MPR-96
Halo MPR-96 Visible Microplate Reader 400-700nm with Temperature Control Module (Ambient +5 to 50 deg C)	MPR-96-TCM
Halo MPR-96-340 Microplate Reader 340-700nm	MPR-96-340
Halo MPR-96-340 TCM Microplate Reader 340-700nm with Temperature Control Module (Ambient +5 to 50 deg C)	MPR-96-340-TCM
Other wavelength filter selection from 340 to 700nm (contact us for detail selections)	MPR-IF-XXX
MikroWin2010 Lite (Screening & Curve Fit, basic functions)	WR-302-03
MikroWin2010 Full Version 1 (Screening & Curve Fit, extended functions)	WR-302-04
MikroWin2010 Full Version 2 (Screening & Curve Fit & Kinetic, extended functions)	WR-302-05

For more information on MikroWin2010 and its features, please visit www.mikrotek.de

Halo PlateMaster 96

Microplate Washer



The Halo PlateMaster 96 microplate washer provides an automated and flexible process control strip washing for microplates.

Flexible Process

Platemaster 96 allows selection from manifolds of 8 or 12 channels, 4 liquid channels, 3 washing methods including normal aspiration, overflow and bottom washing. Working on different assays is easy with the independent liquid channels without frequent bottle changes. The large LCD display with on board control allows up to 40 wash programme storage for easy

operation. It is also compatible with flat, U or V bottom 96-well microplates for different applications.

Reliable Performance

For great value, Platemaster 96 will be your best choice. It is equipped with a 3 speed shaking action to minimize bubbles generated and adherence of liquid to well sides. The waste water sensor for high waste level detection gives you additional reliability. A dispensing precision of better than 2% CV and residual volume < 2 µl are proven with the advanced wash head design.

HALO PLATEMASTER 96 SPECIFICATIONS

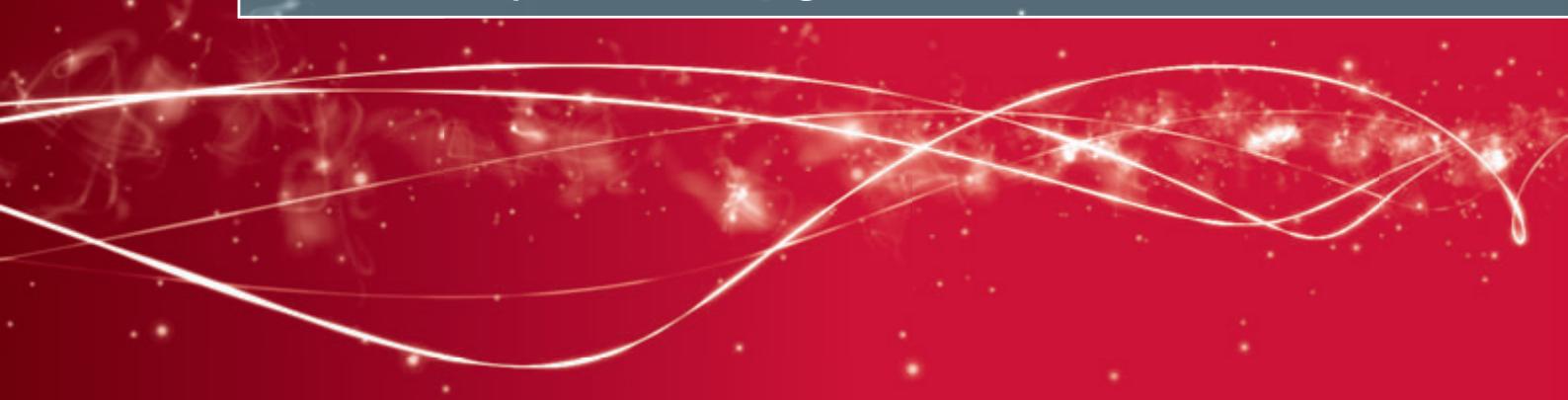
Plate/manifold format	96 well plate with 8 or 12 channel manifold
Wash programs	Up to 40
Dispense volume	Wash liquid volume adjustable from 50 µl to 3000 µl in 50 µl increments
Dispense precision	< 2% CV
Residual volume	< 2 µl per well
Soak time	Up to 990 s with 10s increment
Wash liquid channels	2 (1× wash buffer, 1× rinse liquid) standard. Up to 4-wash liquid option
Shaking speed	3 types
Dimensions (W x D x H(cm))	48 x 35 x 20
Net Weight (kg)	11
Shipping weight (kg)	15
Power supply	100-240 VAC

Halo Platemaster 96 Ordering Information

PRODUCT	CATALOG NUMBER
Halo PlateMaster 96 Microplate Washer 100-240V, 50/60Hz	PM-96



The Velocity Range



Bench Top Centrifuges

Velocity 14 / 14R

Benchtop Centrifuges



The Velocity 14 / 14R centrifuges set a new benchmark in versatility and compactness. The clever design results in a compact footprint yet generous capacity which not only frees up precious bench space but also provides the flexibility to alternate from micro-volume centrifugation to medium-volume centrifugation and all at an impressive maximum speed of 14,000 RPM / 20,290xg (with the FA15C rotor). Furthermore, the V14R incorporates powerful and efficient refrigeration whilst the absence of refrigeration in the Velocity 14 further reduces its footprint by at least 50% compared to that of the Velocity 14R.

Smart, Compact, 3 -in-1 Design

The versatile design of the Velocity 14 / 14R centrifuges offers the best of both worlds from the perspective of micro-volume and medium-volume centrifugation. The FA15A rotor is sufficiently fast and yet accommodating for up to 24 x 1.5/2 ml tubes with a terminal velocity of 14,000 RPM (18,726 x g) whilst the FA15C rotor has sufficient capacity for up to 6 x 50 ml tubes reaching an impressive terminal velocity of 14,000 RPM (20,290 x g) in V14R. The new SW4C Swing Bucket Rotor further expands the flexibility of the Velocity 14/14R centrifuges to incorporate a wide range of new applications.

Quick Set and Forget Rotor System

Screwing or bolting rotors to the drive shaft is a thing of the past. Likewise lost spanners and rotor over tightening. With the Velocity 14 / 14R simply place the rotor on the drive shaft and that's all. The auto lock and secure mechanism performs the rest. Once centrifugation is complete, simply lift the rotor off the drive shaft. Quicker, easier, more efficient and safer.

Auto Rotor Recognition

Microchip technology allows automatic recognition of rotor and confirmation once centrifugation has commenced, including rotational speed calculation and optimum temperature control.

Furthermore, new rotors can be easily loaded onto the on-board database as they are introduced.

Fast Acceleration and Deceleration

The innovative high torque, drive technology effortlessly accelerates even the heaviest rotors to terminal velocity quickly and efficiently. Even the heaviest rotors with a full load will achieve maximum velocity within a few minutes. Furthermore, 9 pre-set acceleration and 9 pre-set deceleration profiles ensure the right conditions are set for the most precious samples including density gradients.

High Imbalance Tolerances

Innovative motor engineering and mounting including a flexible drive shaft allow for greater imbalance tolerances, so that samples can be balanced simply with the naked eye. No more weighing, just fill tubes or bottles to within 5mm of each other.

Powerful Refrigeration (Velocity 14R model only)

A powerful non -CFC compressor cools the chamber quickly whilst maintaining the rotor at set temperature during centrifugation.

Furthermore, twin cooling fans - one each for the compressor and motor respectively - dissipate heat quickly to improve cooling efficiency and extend motor life.

Actual Sample (Rotor) Temperature Measurement and Display (Velocity 14R only)

The temperature displayed on the LCD panel during centrifugation is that of the rotor (and hence samples) and not the temperature of the chamber nor the temperature at the sensor to allow for more precise, reproducible and efficient experimentation.

Safety is Paramount

The Velocity 14 / 14R offers many safety features in the unlikely event of an emergency such as:

Non-contact imbalance detection and shutdown based on the run profile for each rotor across its entire speed range rather than the inferior and conventional micro-switch detector.

- > Guard barrier
- > Dual lid electronic interlock
- > Auto-hinge for improved sealing and door opening
- > Over speed detection and shutdown
- > Motor overheat detection and shutdown

User Friendly Operation

Parameters are quickly and effortlessly inputted through the uncomplicated touch pad interface and displayed on the brightly backlit and easy to read LCD panel.

The LCD panel concurrently displays all experimentation parameters including diagnostic information as it occurs.

Furthermore, once centrifugation has commenced, a real time graphic profile of the centrifugation status is displayed.

Quiet Operation

Noise abating insulation in the console including lower noise fans combine to reduce the audible operating noise to ≤ 53 dB (≤ 58 dB for V14R).

Liquid Seeping Prevention

A single continuous rubber cap with strong gasket, firmly seals the motor chamber opening and drive shaft to prevent liquid from seeping into the motor and electronic components. As additional back-up, a highly absorbent sponge positioned beneath the rubber cap soaks up any liquid or condensation which then evaporates during operation.

Velocity 14R & 14 ROTORS

	CAT. NO.# (rotor material)	V14R (V14) MAX SPEED (RPM)	V14R (V14) MAX RCF (XG)	TUBE VOLUME (ML)	TUBE DESCRIPTION	TUBE DIMENSIONS (ϕ x L) MM	CAPACITY	ADAPTOR
Fixed Angle Rotors								
	FA15A (Aluminium)	14,000 (14,000)	18,728 (18,728)	1.5 /2.0	Standard micro-tube	10.5 x 41	24 x 1.5/2.0 ml	N/A
	"	"	0.5	PCR single tube	8 x 32	24 x 0.5 ml	FA15A.05	
	"	"	0.2	PCR single tube	6 x 24	25 x 0.2ml	FA15A.02	
	FA12A (Aluminium)	12,000 (12,000)	12,290 (12,290)	0.2	PCR single or strip	6 x 24	48 x 0.2 ml	N/A
	FA18A (Aluminium)	14,000 (14,000)	16,200 (16,200)	10	Round Bottom	16 x 81	8 x 10 ml	N/A
	FA15B (Aluminium)	14,000 (12,000)	18,990 (13,950)	50	Round Bottom	29 x 106	4 x 50 ml	N/A
	"	"	15	Culture V Bottom	17 x 120	4 x 15 ml	FA15.15C	
	"	"	15	Round Bottom	16.5 x 113	4 x 15 ml	FA15.15R	
	FA15C (Aluminium)	14,000 (12,000)	20,290 (14,900)	50	Round Bottom	29 x 106	6 x 50 ml	N/A
	"	"	15	Culture V Bottom	17 x 120	6 x 15 ml	FA15.15C	
	"	"	15	Round Bottom	16.5 x 113	6 x 15 ml	FA15.15R	
	FA10E (Aluminium)	10,000 (10,000)	10,600 (10,600)	50	Culture V Bottom	29 x 115	4 x 50 ml	N/A
	"	"	15	Culture V Bottom	17 x 120	4 x 15 ml	FA10.15C	
	"	"	15	Round Bottom	16.5 x 113	4 x 15 ml	N/A	
Swing Bucket Rotor								
	SW4C* (Aluminium)	4,000 (4,000)	1,780 (1,780)	5	Blood collection	12 x 106	4 x 5 ml	Included

* Without rotor lid

VELOCITY 14R & 14 SPECIFICATIONS	V14R	V14
Maximum Speed	14,000 RPM (FA15C rotor)	14,000 RPM (FA15A rotor)
Maximum RCF	20,290 x g (FA15C rotor)	18,728 x g (FA15A rotor)
Maximum Capacity	300 ml (6 x 50 ml)	
Drive Mechanism	Brushless Induction	
Control	Microprocessor based	
Speed Range	300-14,000 RPM (100 RPM increments)	
Speed Accuracy	±20 RPM	
Speed / RCF Conversion	Yes	
Timer	1 min - 99 Hrs 59 mins plus HOLD function	
Display	Backlit LCD	
Operating Noise	<58dB (A)	<53dB (A)
Temperature Range	-20°C to +40°C	-
Temperature Accuracy	±2°C	-
Acceleration/Deceleration	9 stages / 9 stages	
Automatic Rotor Identification	Yes	
Imbalance Detection	Yes	
Dimensions (L x D x H)	560 x 500 x 380 mm	340 x 490 x 380 mm
Weight (Net)	60 Kg	40 Kg
Power Supply	Single Phase AC 220V ±2V, 50Hz, 10A	Single Phase AC 220V ±2V, 50Hz, 8A

Velocity 14R & 14 Ordering Information

PRODUCT	CATALOG NUMBER#
Velocity 14R Refrigerated Centrifuge	(220V, 50Hz) V14R-2
Velocity 14R Refrigerated Centrifuge	(220V, 60Hz) V14R-2A
Velocity 14R Refrigerated Centrifuge	(110V, 60Hz) V14R-1
Velocity 14 Centrifuge	(220V, 50/60Hz) V14-2
Velocity 14 Centrifuge	(110V, 60Hz) V14-1

Velocity 18R

Refrigerated Benchtop Centrifuge



The Velocity 18R delivers high capacity, refrigerated centrifugation with an impressive maximum speed of 18,000 RPM (27,070 x g) (with the fixed angle FA18 rotor) and all from the convenience of the bench.

Quick Set and Forget Rotor System

Screwing or bolting rotors to the drive shaft is a thing of the past. Likewise lost spanners and rotor over tightening. With the Velocity 18R simply place the rotor on the drive shaft and that's all. The auto lock and secure mechanism performs the rest. Once centrifugation is complete, simply lift the rotor off the drive shaft. Quicker, easier, more efficient and safer.

Auto Rotor Recognition

Automatic rotor recognition and confirmation once centrifugation has commenced, including rotational speed calculation and optimum temperature control.

Furthermore new rotors can be easily loaded onto the on-board database as they are introduced.

Fast Acceleration and Deceleration

The innovative high torque, drive technology effortlessly accelerates even the heaviest rotors to terminal velocity quickly and efficiently. Even the heaviest rotors with a full load will achieve maximum velocity within a few minutes. Furthermore, 9 pre-set acceleration and 9 pre-set deceleration profiles ensure the best separation even for the most delicate density gradients.

High Imbalance Tolerances

Innovative motor engineering and mounting including a flexible drive shaft allow for greater imbalance tolerances, so that samples can be balanced simply with the naked eye. No more weighing just fill tubes or bottles to within 5mm of each other.

Powerful Refrigeration

A powerful non-CFC compressor cools the chamber quickly whilst maintaining the rotor at set temperature during centrifugation. Furthermore, twin cooling fans - one each for the compressor and motor respectively - dissipate heat quickly to improve cooling efficiency and extend motor life.

Actual Sample (Rotor) Temperature Measurement and Display

The temperature displayed on the LCD panel during centrifugation is that of the rotor (and hence samples) and not the temperature of the chamber nor the temperature at the sensor to allow for more precise, reproducible and efficient experimentation.

Safety is Paramount

The Velocity 18R offers many safety features in the unlikely event of an emergency such as:

Non-contact imbalance detection and shutdown based on the run profile for each rotor across its entire speed range rather than the inferior and conventional micro-switch detector.

- > Guard barrier
- > Dual lid electronic interlock
- > Auto-hinge for improved sealing and door opening
- > Over speed detection and shutdown
- > Motor overheat detection and shutdown

User Friendly Operation

Parameters are quickly and effortlessly inputted through the uncomplicated touch pad interface and displayed on the brightly backlit and easy to read LCD panel.

The LCD panel concurrently displays all experimentation parameters including diagnostic information as it occurs. Furthermore, once centrifugation has commenced, a real time graphic profile of the centrifugation status is displayed.

Quiet Operation

Noise abating insulation in the console including lower noise fans combine to reduce the audible operating noise to ≤ 58 dB.

Liquid Seeping Prevention

A single continuous rubber cap with strong gasket, firmly seals the motor chamber opening and drive shaft to prevent liquid from seeping into the motor and electronic components. As additional back-up, a highly absorbent sponge positioned beneath the rubber cap soaks up any liquid or condensation which then evaporates during operation.

Velocity 18R ROTORS

CAT. NO.# (rotor material)	MAX SPEED (RPM)	MAX RCF (XG)	TUBE VOLUME (ML)	TUBE DESCRIPTION	TUBE DIMENSIONS (ϕ x L) MM	CAPACITY	ADAPTOR
Fixed Angle Rotors							
FA18B (Aluminium)	18,000	24,990	1.5/2.0	Standard micro-tube	10.5 x 41	18 x 1.5/2.0 ml	N/A
	"	"	0.5	PCR single tube	8 x 32	18 x 0.5 ml	FA15.05
	"	"	0.2	PCR single tube	6 x 24	18 x 0.2 ml	FA15.02
FA15A (Aluminium)	15,000	21,500	1.5 /2.0	Standard micro-tube	10.5 x 41	24 x 1.5/2.0 ml	N/A
	"	"	0.5	PCR single tube	8 x 32	24 x 0.5 ml	FA15.05
	"	"	0.2	PCR single tube	6 x 24	25 x 0.2ml	FA15.02
FA15P# (Plastic)*	15,000	18,800	1.5 /2.0	Standard micro-tube	10.5 x 41	18 x 1.5/2.0 ml	N/A
	"	"	0.5	PCR single tube	8 x 32	18 x 0.5 ml	FA15.05
	"	"	0.2	PCR single tube	6 x 24	18 x 0.2ml	FA15.02
FA12A (Aluminium)	12,000	14,100	0.2	PCR single or strip	6 x 24	48 x 0.2 ml	N/A
FA18A (Aluminium)	18,000	27,070	10	Round Bottom	16 x 81	8 x 10 ml	N/A
FA15B (Aluminium)	15,000	21,800	50	Round Bottom	29 x 106	4 x 50 ml	N/A
	"	"	15	Culture V Bottom	17 x 120	4 x 15 ml	FA15.15C
	"	"	15	Round Bottom	16.5 x 113	4 x 15 ml	FA15.15R
FA15C (Aluminium)	15,000	23,300	50	Round Bottom	29 x 104	6 x 50 ml	N/A
	"	"	15	Culture V Bottom	17 x 120	6 x 15 ml	FA15.15C
	"	"	15	Round Bottom	16.5 x 113	6 x 15 ml	FA15.15R
FA15D (Aluminium)	15,000	20,900	80	Round Bottom	38 x 106	4 x 80 ml	N/A
FA10B (Aluminium)	10,000	11,400	50	Culture V Bottom	29 x 115	6 x 50 ml	N/A
	"	"	15	Culture V Bottom	17 x 120	6 x 15 ml	FA10.15C
Swing Bucket Rotors							
SW5* (Aluminium Bucket)	4,800	4,170	250	Bottle	61.6 x 135	4 x 250ml	N/A
	4,800	4,170	5	Blood collection	12-13 x 75-78	28 x 5ml	SW5.5B
	4,800	4,170	7	Blood collection	12-13 x 100	28 x 7ml	SW5.7B
	4,800	4,170	10	Blood collection	16 x 100	28 x 10ml	SW5.10B
	3,000	1,630	10	Round Bottom	12 x 105	28 x 10ml	SW5.10G
	3,000	1,630	15	Round Bottom	17 x 110	28 x 15ml	SW5.15G
	4,800	4,170	15	Round Bottom	16.5 x 113	16 x 15ml	SW5.15P*
	4,800	4,170	15	Culture V Bottom	17 x 120	12 x 15ml	SW5.15CA
	4,800	4,170	15	Culture V Bottom	17 x 120	16x 15ml	SW5.15CB*
	4,800	4,170	50	Round Bottom	29 x 104	4 x 50ml	SW5.50P
	4,800	3,990	50	Round Bottom	35 x 100	4 x 50ml	SW5.50G
	4,800	4,170	50	Culture V Bottom	29 x 115	4x 50ml	SW5.50C
SW5MP* (Aluminium)	4,800	3,120	96 Well Microplates	PCR / Culture	128W x 86L x 14H	2 x Plates	N/A
	"	"	96 Deep Well Plates	PCR / Culture	128W x 86L x 55H	2 x Plates	N/A
	"	"	1.5 /2.0	Standard micro-tube	10.8 x 40.5	48x 1.5/2.0 ml	SW5MP.15
	"	"	0.2	PCR single or strip		192x 0.2 ml	SW5MP.02
SW4A* (Aluminium)	4,000	2,900	15	Culture V Bottom	17 x 120	24 x 15ml	SW4A.15C
	4,000	2,860	50	Culture V Bottom	29 x 115	8 x 50ml	SW4A.50C

* Without rotor lid

** Plastic seal caps cannot be used with these adaptors

Rotor / buckets are autoclavable at 121°C except

VELOCITY 18R SPECIFICATIONS	V18R
Maximum Speed	18,000 RPM (FA18A rotor)
Maximum RCF	27,070 x g (FA18A rotor)
Maximum Capacity	1,000 ml (4 x 250 ml)
Drive Mechanism	Brushless Induction
Control	Microprocessor based
Speed Range	300-18,000 RPM (100 RPM increments)
Speed Accuracy	±20 RPM
Speed / RCF Conversion	Yes
Timer	1 min - 99 Hrs 59 mins plus HOLD function
Display	Backlit LCD
Operating Noise	<58dB (A)
Temperature Range	-20°C to +40°C
Temperature Accuracy	±2°C
Memory	9 Programs
Acceleration/Deceleration	9 stages / 9 stages
Automatic Rotor Identification	Yes
Imbalance Detection	Yes
Dimensions (L x D x H)	730 x 610 x 380 mm
Weight (Net)	100 Kg
Power Supply	Single Phase AC 220V - 240V, 50/60Hz, 10A

Velocity 18R Ordering Information

PRODUCT	CATALOG NUMBER#
Velocity 18R Refrigerated Centrifuge	(220V, 50Hz) V18R-2
Velocity 18R Refrigerated Centrifuge	(220V, 60Hz) V18R-2A
Velocity 18R Refrigerated Centrifuge	(110V, 60Hz) V18R-1

Velocity 10R

Refrigerated Benchtop Centrifuge



The Velocity 10R takes the helm as Dynamica's highest capacity centrifuge – up to 3 litres with the SW3A rotor. Powerful refrigeration combined with an exceptional maximum speed of 10,000 RPM (12,740 x g with the FA10D rotor) offer the versatility and convenience to manage a wide range of larger scale applications and all in a footprint sufficiently compact to fit on a bench.

Auto Rotor Recognition

Microchip technology allows automatic rotor recognition and confirmation once centrifugation has commenced, including rotational speed calculation and optimum temperature control.

Furthermore new rotors can be easily loaded onto the on-board database as they are introduced.

Fast Acceleration and Deceleration

The innovative, heavy duty, frequency conversion motor is purposely designed to handle the heaviest of rotors with abundant power output for smooth, quick and efficient acceleration to terminal velocity under fully laden conditions. Furthermore, 9 pre-set acceleration and 9 pre-set deceleration profiles ensure the right conditions are met for the most precious and vibration sensitive samples.

Powerful Refrigeration

A powerful non -CFC compressor cools the chamber quickly whilst maintaining the rotor at set temperature during centrifugation.

Furthermore, twin cooling fans - one each for the compressor and motor respectively - dissipate heat quickly to improve cooling efficiency and extend motor life.

Actual Sample (Rotor) Temperature Measurement and Display

The temperature displayed on the LCD panel during centrifugation is that of the rotor (and hence samples) and neither the temperature of the chamber nor the temperature at the sensor. This allows for more precise, reproducible and efficient experimentation.

Safety is Paramount

The Velocity 10R offers many safety features in the unlikely event of an emergency such as:

Non-contact imbalance detection and shutdown based on the run profile for each rotor across its entire speed range rather than the inferior and conventional micro-switch detector.

- > Guard barrier
- > Dual lid electronic interlock
- > Auto-hinge for improved sealing and door opening
- > Over speed detection and shutdown
- > Motor overheat detection and shutdown

User Friendly Operation

Parameters are quickly and effortlessly inputted through the ergonomic touch pad interface and displayed on the brightly backlit and easy to read LCD panel.

The LCD panel concurrently displays all experimentation parameters including diagnostic information as it occurs. Furthermore, once centrifugation has commenced, a real time graphic profile of the centrifugation status is displayed.

Quiet Operation

Noise abating insulation in the console including lower noise fans combine to reduce the audible operating noise to ≤ 62 dB - quite impressive for a large capacity, refrigerated centrifuge such as the Velocity 10R.

Liquid Seeping Prevention

A single continuous rubber cap with strong gasket, firmly seals the motor chamber opening and drive shaft to prevent liquid from seeping into the motor and electronic components. As additional back-up, a highly absorbent sponge positioned beneath the rubber cap soaks up any liquid or condensation which then evaporates during operation.

Velocity 10R ROTORS

ROTOR TYPE	CAT. NO.# (rotor material)	MAX SPEED (RPM)	MAX RCF (XG)	TUBE VOLUME (ML)	TUBE DESCRIPTION	TUBE DIMENSIONS (φ X L) MM	CAPACITY	ADAPTOR
Fixed Angle Rotors								
	FA8B (Aluminium)	8,000 8,000 8,000	9,180 9,000 8,900	50 15 15	Culture V Bottom Culture V Bottom Round Bottom	29 x 115 17 x 120 16.5 x 113	10 x 50 ml 10 x 15 ml 10 x 15ml	N/A FA8B.15C FA8B.15P
	FA8C (Aluminium)	8,000 8,000 8,000	9,560 9,200 9,350	50 15 15	Round Bottom Culture V Bottom Round Bottom	29 x 106 17 x 120 16.5 x 113	12 x 50 ml 12 x 15 ml 12 x 15 ml	- FA8C.15C FA8C.15P
	FA10D (Aluminium)	10,000 10,000 10,000	12,740 11,840 12,070	80 50 50	Round Bottom Culture V Bottom Round Bottom	38 x 106 29 x 115 29 x 106	6 x 80 ml 6 x 50 ml 6 x 50 ml	- FA10D.50C FA10D.50P
Swing Bucket Rotors								
	SW3A (Aluminium)	3,200	2,500	750	Bottle	97 x 157	4 x 750 ml	N/A
	SW4B (Aluminium)	4,000 4,000 4,000 4,000 4,000 4,000 4,000 4,000	3,500 3,500 3,500 3,500 3,450 3,510 3,500 3,500	250 + 50 3 5 7 10 15 50 50	Bottle + Culture V Bottom Blood Collection Blood Collection Blood Collection Blood Collection Culture V Bottom Culture V Bottom Culture V Bottom	61.6 x 135 & 30 x 116 12 x 81 12.5 x 106 12.5 x 106 17 x 120 29 x 115 29 x 115	2 x 250 ml + 2 x 50 ml 120 x 3 ml 120 x 5 ml 120 x 7 ml 120 x 10 ml 64 x 15 ml 20 x 50 ml 32 x 50 ml	SW4B.250P SW4B.3B SW4B.5B SW4B.5B SW4B.10B SW4B.15C SW4B.50CB SW4B.50CA*

* Without rotor lid

VELOCITY 10R SPECIFICATIONS	V10R
Maximum speed	10,000 RPM (FA10D)
Maximum RCF	12,740 x g (FA10D rotor)
Maximum capacity	3,000 ml (4 x 750ml)
Drive Mechanism	Frequency conversion motor
Control	Microprocessor based
Speed Range	300- 10,000 RPM (100 RPM increments)
Speed Accuracy	±20 RPM
Speed/ RCF conversion	Yes
Timer	1 min- 99 Hrs 59 mins plus HOLD function
Display	Backlit LCD
Operating Noise	≤62 dB (A)
Temperature range	-20°C to 40°C
Temperature accuracy	±2°C
Memory	9 programs
Acceleration	9 stages / 9 stages
Automatic Rotor Identification	Yes
Imbalance Detection	Yes
Dimensions (L x D x H)	876 x 695 x 460 mm
Weight (Net)	160 Kg
Power requirements	Single phase 200v – 240V, 50Hz / 60Hz, 15A

Velocity 10R Ordering Information

PRODUCT	CATALOG NUMBER#
Velocity 10R Refrigerated Centrifuge	(220V, 50Hz) V10R-2
Velocity 10R Refrigerated Centrifuge	(110V, 60Hz) V10R-1

Velocity 15 μ

High Speed Microcentrifuge



FAS15B

The Velocity 15 μ High Speed Microcentrifuge is designed to accelerate your laboratory works by providing excellent and reliable performance. The Velocity 15 μ is compact and easy to use.

Features & Characteristics

- > Maximum speed 15,000rpm (21,380 xg)
- > Choices of rotors for 24 x 0.2/0.5/1.5/2.0ml tubes, 18 x 5ml tubes, 36 x 0.5ml tubes and 4x 8-strip PCR tubes
- > Autoclavable Bio-safe rotors
- > Advanced air-cooling technology to lower rotor temperature
- > Automatic lid release after run
- > Dual door interlock safety design
- > User-friendly control panel with large LCD display

VELOCITY 15 μ SPECIFICATIONS

	Velocity 15 μ
Maximum Speed	15,000 RPM
Maximum RCF	21,380 xg
Run Time	30 Seconds to 99 Minutes or HOLD (Continuous)
Rotor (Standard)	24 x 1.5/2.0 ml tubes
Rotor (Optional)	18 x 5 ml tubes, 36 x 0.5 ml tubes, 4 x 0.2ml 8-strip PCR tubes
Dimensions	280 x 364 x 266 mm (w x d x h)
Weight	12 kg
Power Supply	AC 200-240V 50/60Hz or AC 110-120V 50/60Hz

Velocity 15 μ Ordering Information

PRODUCT	CATALOG NUMBER#
Velocity 15 μ High Speed Microcentrifuge, with FAS15B aluminum alloy rotor kit, 200-240V, 50/60Hz	V15U-220
Velocity 15 μ High Speed Microcentrifuge, with FAS15B aluminum alloy rotor kit, 110-120V, 50/60Hz	V15U-110
18 place rotor with lid, 5ml x 18, 15000rpm	FAS15A
24 place rotor with lid, 1.5/2ml x 24, 15000rpm	FAS15B
36 place rotor with lid, 0.5ml x 36, 15000rpm	FAS15C
4 place 8-strip PCR tubes rotor with lid, 15000rpm	FAS15D
0.2ml rotor adapter, used with FAS15B 24 place rotor, 24pcs/pk	FAS15B.02
0.5ml rotor adapter, used with FAS15B 24 place rotor, 24pcs/pk	FAS15B.05
0.2ml rotor adapter, used with FAS15C 36 place rotor, 36pcs/pk	FAS15C.02

Velocity 13 μ Mini Fuge



The Velocity 6 μ and 13 μ are designed to operate easily and save space. They also offer a high degree of convenience and ultimate safety for your laboratory application.

Features & Characteristics

- > Maximum speed 13,500rpm (12,300 xg)
- > Choices of rotors for 12 x 1.5/2.0ml tubes and 32 PCR tubes or strips
- > Compact design
- > Rapid acceleration (\leq 12 sec) and deceleration (\leq 16 sec)
- > Autoclavable rotor
- > Safe operation with lid-lock function
- > User-friendly control panel with LCD display

VELOCITY 13 μ SPECIFICATIONS	Velocity 13 μ
Maximum Speed	13,500 RPM
Maximum RCF	12,300 x g
Run Time	Up to 30 minutes or HOLD (Continuous)
Rotor (Standard)	12 x 1.5/2.0 ml tubes
Rotor (Optional)	32 x 0.2 ml PCR tubes or strips
Dimensions	208 x 245 x 145 mm (w x d x h)
Weight	4.4 kg
Power Supply	AC 200-240V 50/60Hz or AC 110-120V 50/60Hz

Velocity 13 μ Ordering Information

PRODUCT	CATALOG NUMBER#
Velocity 13 μ Mini Fuge, with FA13A rotor & FA13.02 Adapters, 200-240V, 50/60Hz	V13U-2A
Velocity 13 μ Mini Fuge, with FA13A rotor & FA13.02 Adapters, 110-120V, 50/60Hz	V13U-1A
12 place rotor, 1.5/2ml x 12, 13,500rpm	FA13A
32 place rotor, 0.2ml x 32 PCR tubes or 4x 8-strip PCR tubes, 6,000rpm	FA6B
0.2ml PCR tube rotor adapter, used with FA13A rotor, 12pcs/pk	FA13.02
0.5ml PCR tube rotor adapter, used with FA13A rotor, 12pcs/pk	FA13.05

Velocity 6μ

Micro Fuge



Features & Characteristics

- > Microtubes rotor and 8-strip rotor included
- > Rotors can be easily exchanged without tools
- > Compact design
- > Simple & user-friendly operation
- > Quiet operation (noise level ≤ 45dB)

VELOCITY 6μ SPECIFICATIONS

	Velocity 6μ
Maximum Speed	6,000 RPM
Maximum RCF	2,910 x g
Run Time	Continuous
Rotor (Standard)	8 x 1.5/2.0 ml, 2 x 8-strip PCR or 16 x 0.2 ml PCR tubes
Rotor (Optional)	-
Dimensions	155 x 175 x 125 mm (w x d x h)
Weight	1 kg
Power Supply	AC 110-220V 50/60Hz

Velocity 6μ Ordering Information

PRODUCT	CATALOG NUMBER#
Velocity 6μ Micro Fuge, with microtube rotor & tube-stripes rotor, 110-220V, 50/60Hz	V6U



The C-Master Range



Thermal Cyclers

C-Master GT/RT

Thermal Cylcers



The C-Master series thermal cyclers are designed with a unique combination of features to deliver excellent and reliable performance with easy operation and compact footprint.

Excellent & Reliable Performance

To ensure that all wells are maintained at the proper temperature throughout each incubation step, C-Master provides excellent thermal accuracy and uniformity of $\pm 0.2^{\circ}\text{C}$ for non-gradient protocols and $\pm 0.3^{\circ}\text{C}$ for gradient protocols. C-Master is also capable to produce high temperature ramp rates to shorten the time to reach target temperature.

User Friendly Operation

The 7-inch color touch screen interface allows you to quickly manage your programs and start the runs with ease. The interface with intuitive software features color graphic, easy program, folder editing, personalized password protection and on-board storage capacity of more than 10,000 programs.

Efficient Optimization

(Feature of C-Master GT Gradient Thermal Cycler)

C-Master GT allows you to optimize your protocol in a single run by testing 12 different incubation temperatures simultaneously across a wide range of 30°C . Together with the latest Peltier technology, the gradient calculator controls and ensures high accuracy and uniformity of each column.

Other Features

- > Innovative 9677 block included (96x 0.2ml and 77x 0.5ml tubes)
- > Interchangeable block design
- > Heated lid with adjustable pressure
- > Lid heating will automatically turn off if block temperature is lower than 30°C
- > Easy storage and transfer protocols among cyclers using a USB storage device
- > Capable to control 100+ thermal cyclers with optional PC Management Software

C-MASTER GT & RT SPECIFICATION	C-MASTER GT GRADIENT THERMAL CYCLER	C-MASTER RT REGULAR THERMAL CYCLER
Block Temperature		0°C to 100°C
Block Uniformity		≤±0.2°C (at 95°C)
Temperature Accuracy		≤±0.2°C (at 35°C to 100°C)
Max. Ramp Rate	Heating 6 °C / Cooling 5 °C	Heating 4 °C / Cooling 3.5 °C
Average Ramp Rate	Heating 3.8 °C / Cooling 2.5 °C	Heating 2.3 °C / Cooling 1.7 °C
Gradient	30-99.9 °C (Max. Range 30 °C)	Nil
Heated Lid Temperature		30 °C to 112 °C
Memory Onboard	Max. 15,000 Steps	Max. 10,000 Steps
Memory Expansion		USB Flash Drive
Dimensions		256 x 362 x 255mm (w x d x h)
Weight		7.3kg
Power Supply		110-220V 50/60Hz

C-Master GT Ordering Information

PRODUCT	CATALOG NUMBER#
C-Master GT Gradient Thermal Cycler, with one 9677 Gradient Block*	DYNAM-CMGT
9677 Gradient Block, 96 x 0.2ml & 77 x 0.5ml	DYNAM-CMGT-9677
96 Gradient Block, 96 x 0.2ml	DYNAM-CMGT-96
48 Gradient Block, 48 x 0.2/0.5ml	DYNAM-CMGT-48
108 Gradient Block, 108 x 0.2ml & 88 x 0.5ml	DYNAM-CMGT-108
Multi-Purpose Gradient Block, 9677 + In-Situ Adaptor	DYNAM-CMGT-MULTI
PC Management Software, for C-Master GT	DYNAM-CMGT-PCMS

C-Master RT Ordering Information

PRODUCT	CATALOG NUMBER#
C-Master RT Regular Thermal Cycler, with one 9677 Non-Gradient Block*	DYNAM-CMRT
9677 Non-Gradient Block, 96 x 0.2ml & 77 x 0.5ml	DYNAM-CMRT-9677
96 Non-Gradient Block, 96 x 0.2ml	DYNAM-CMRT-96
48 Non-Gradient Block, 48 x 0.2/0.5ml	DYNAM-CMRT-48
108 Non-Gradient Block, 108 x 0.2ml & 88 x 0.5ml	DYNAM-CMRT-108
384 Non-Gradient Block	DYNAM-CMRT-384
Multi-Purpose Non-Gradient Block, 9677 + In-Situ Adaptor	DYNAM-CMRT-MULTI
PC Management Software, for C-Master RT	DYNAM-CMRT-PCMS

* For research purpose ONLY, not available for the US and European market.



The pHMaster Range

pH Meters

pHMaster

pH Meters for Routine Measurement and Life Science



Shown with optional stirrer.

The New pHMaster range of pH meters is designed for the contemporary laboratory environment and also specialized applications in biological and life sciences.

The small footprint belies advanced features augmented with a remarkable easy to use layout and all packaged in a robust casing to withstand the rigors of the laboratory. All models feature a user selectable 1, 2 or 3 points calibration with an automatic buffer recognition function.

The pHMaster BIO is designed with biological and life science applications in mind and is packaged with a combination electrode specific for TRIS buffer preparation thus overcoming the issues of inaccuracy obtained with general pH probes. There is also an optional micro pH electrode with a 4.5mm diameter for small volume applications in 1.5/2ml micro tubes.

For general laboratory applications, the pHMaster LAB is the ideal choice as it is packaged with a convenient 3-in-1 pH/ATC electrode which continuously compensates for any temperature fluctuations. Furthermore a variety of different electrodes is available for many applications involving environmental water, food, solid or semi-solid samples.

The optional smart stirrer provides the homogeneous conditions for more accurate pH measurements.

Features and Characteristics

- > Compact, light weight design (880g)
- > Large, backlit LCD for easy reading
- > Intuitive and easy to use interface
- > Wide pH measurement range from -2.00 up to 20.00 pH value
- > Automatic temperature compensation (ATC)
- > Built-in memory for up to 600 sets of stored data
- > Electrode holder inclusive
- > Acquisition software inclusive for downstream analysis of data
- > Industry standard BNC connector accepts other brands of compatible pH electrodes
- > Up to 3 points calibration with automatic buffer recognition function

General Purpose Laboratory pH Meter

pHMASTER LAB SPECIFICATIONS		
Range	pH	-2.00 to 20.00 pH
	ORP	±1999 mV
	Temperature	-10 to 110°C
Resolution	pH	±0.01 pH
	ORP	±0.1% full scale
	Temperature	±0.5°C
Calibration	No of calibration points	User selectable 1, 2 or 3 points
	Automatic buffer recognition	4.00, 7.00, 10.01 4.00, 6.86, 9.18
	ATC	0 to 100°C
Other parameters	Data storage	600 groups
	Communication port	RS-232
	Power	DC9V/300mA
Electrode	Dimensions (mm)	160 x 190 x 70
	Weight	880 g
	201T-M - Plastic housing non-refillable pH/ATC 3-in-1 electrodes	
	BNC connector	

Biological and Life Science Application pH Meter

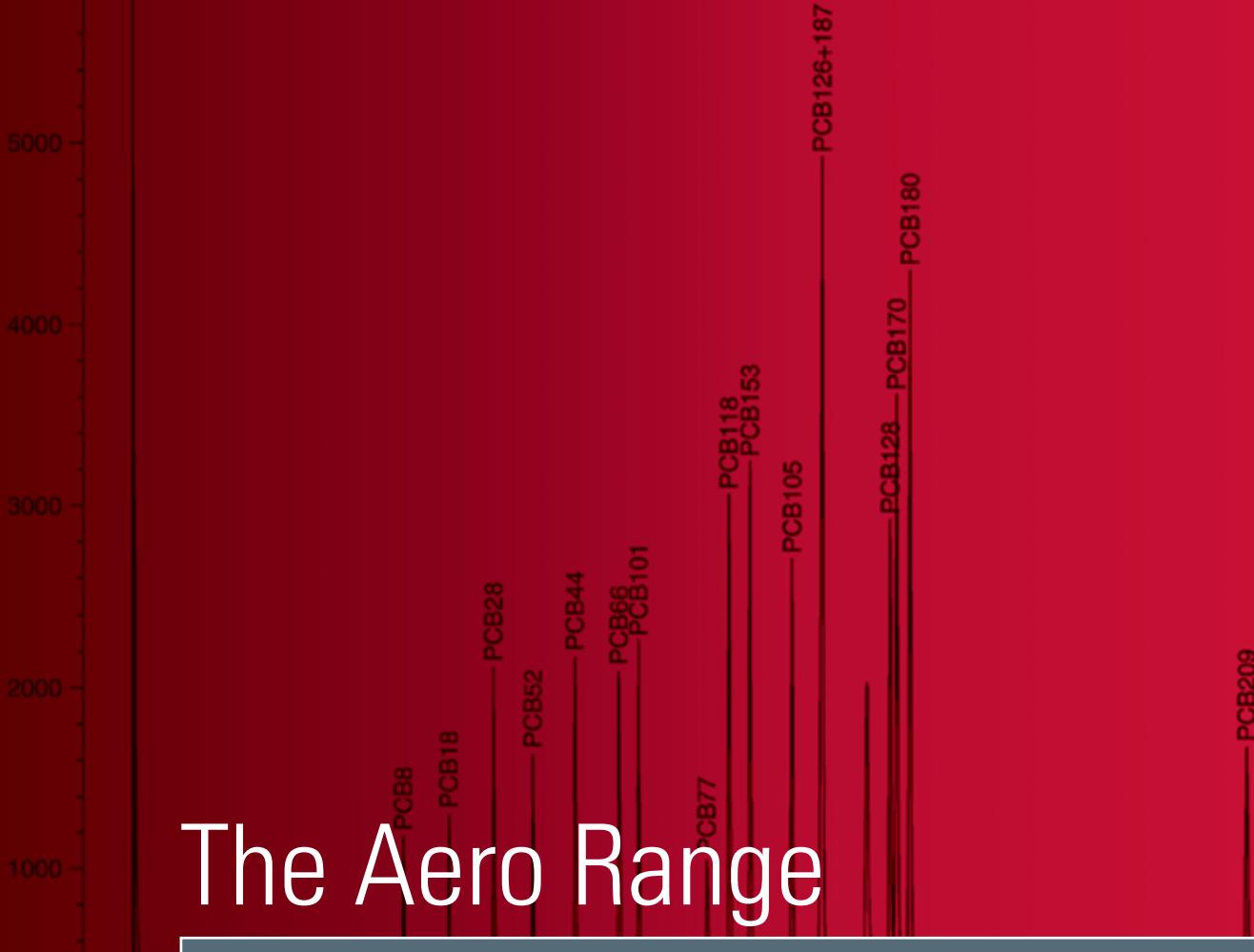
pHMASTER BIO SPECIFICATIONS		
Range	pH	-2.00 to 20.00 pH
	ORP	±1999 mV
	Temperature	-10 to 110°C
Resolution	pH	±0.01 pH
	ORP	±0.1% full scale
	Temperature	±0.5°C
Calibration	No of calibration points	User selectable 1, 2 or 3 points
	Automatic buffer recognition	4.00, 7.00, 10.01 4.00, 6.86, 9.18
	ATC	0 to 100°C
Other parameters	Data storage	600 groups
	Communication port	RS-232
	Power	DC9V/300mA
Electrode	Dimensions (mm)	160 x 190 x 70
	Weight	880 g
	P16-TRIS - Glass refillable pH 2-in-1 combine electrode (compatible to TRIS buffer), MP500 temperature probe	
	BNC connector	

pHMaster LAB / BIO Ordering Information

PRODUCT	CATALOG NUMBER
pHMaster LAB – includes electrode holder, type 201T-M plastic pH/ATC 3-in-1 non-refillable electrode, calibration buffers pH4.0 / 7.0 / 10.01, dust cover	PHM-L-220
pHMaster BIO – includes electrode holder, type P16-TRIS glass 2-in-1 refillable electrode, type MP500 temperature probe, calibration buffers pH4.0 / 7.0 / 10.01, dust cover	PHM-B-220
Smart Stirrer (maximum 2300 rpm)	SSTIR

The Aero Range

Gas Chromatograph



Aero A700

Gas Chromatograph



The Aero A700 is a high performance multi-channel gas chromatograph designed for a broad range of analytical applications. It has the analytical capability and flexibility required for laboratories performing routine analyses as well as those involved in research and development. In combination with the GS10 Autosampler, the Aero A700 offers complete automation of a sequential and unattended run of up to 110 samples.

Improved Performance with EasyFlow Technology

With the EasyFlow Technology, carrier-gas flows are automatically adjusted to compensate for the variations of ambient temperature and pressure. This innovative technology enhances system stability and delivers constant retention time reproducibility.

Up to 18 EasyFlow channels can be installed in Aero A700. The carrier gas flow can be manipulated either by constant pressure mode or constant flow rate mode.

Single-channel or Multi-channel Configurations

Provide Optimal Analytical Capability

Aero A700 is available with up to three channels configurations with a choice of capillary (split/splitless) injectors and packed-column injectors as well as a selection of six detectors.

Capillary (split/splitless) injectors are applicable to narrow bore and wide bore capillary column. The nut and seal components of the injector are gold-plated to prevent chemical reaction with sample at elevated temperature.

Packed Column Injectors are applicable to packed column or wide bore capillary column. With septum purge function, interference caused by bleeding of the septum at high temperature is minimized.

Large Column Oven with High Precision Temperature Control System

The column oven can accommodate 1 to 3 capillary columns with door-open protection and overheat protection, and a maximum of 10 temperature zones. Fast temperature ramping of up to 80°C/min is achievable by using powerful fan & heating block system as well as the intelligent door-interlock mechanism.

Aero Link Software & Standalone Operation

Aero Link is a powerful and user friendly software specifically designed for the control and data processing of the Aero Series gas chromatography systems. Besides, the Aero A700 is fully equipped and capable of executing all functions in standalone mode.

User Friendly Operation and Information Rich LCD Display

The extra-large backlit LCD screen displays a large array of data also in graphical format. The seamless and chemical resistant keypad is designed for easy and quick selection of navigation and function features.

Wide Range of Detector Selection for Various Applications

TCD Thermal Conductivity Detector

- > Generally used analysis of inorganic gases and concentrated organic compounds.
- > High quality Rhenium-Tungsten filament is used together with the constant flow control of dual column balance mode.

FID Flame Ionization Detector

- > Used for analysis of volatile organic compounds.
- > The column flow can be measured directly thanks to the sealed main body design.

ECD Electron Capture Detector

- > The ECD is suitable for analysis of electrophilic compounds such as chlorinated pesticide residue.
- > The micro-flow cell design shortens stabilization time.

FPD Flame Photometric Detector

- > The FPD is used for analysis of organic sulphur compounds and organic phosphorus compounds such as residual pesticides and malodorous components.
- > High quality PMT is used to ensure high sensitivity.



NPD Nitrogen Phosphorus Detector

- > Suitable for analysis of nitrogen or phosphorus containing compounds.
- > Premium grade Rubidium bead is used to ensure high sensitivity and durability.

PID Photo Ionization Detector

- > Suitable for analysis of aromatic compounds.
- > Universal non-destructive and high sensitivity detector.

Aero A700 provides standard system for some of the most common applications as well as customized solutions to fulfill your requirement.

Food Additive and Pesticide Residue Analysis

- > Equipped with ECD to detect residual BHC, DDT, Pyrethrins in food.
- > FPD/NPD is used to detect residual phosphorus containing pesticides or carbamates in food.
- > FID is used to analyze additive in food such as sorbic acid, benzoic acid, etc.

Solvent Residue Analysis

- > Detection of residual solvent in food packaging material and drugs according to the pharmacopeia.
- > Equipped with FID and combining headspace sampler.

VOC Analysis

- > Equipped with FID, PTV injector and a dedicated column.
- > Detection of benzene toluene, xylenes and total volatile organic compounds.

Gas Analysis

- > For the analysis of LPG, natural gas, artificial gas, fermented gas, etc.
- > With multifunction external event controller for automatic switching of different kinds of gas sampling valves.

Oxygenates Analysis

- > Specifically designed for the analysis of gasoline, fuel oil and ethanol containing diesel fuel.
- > Equipped with FID, multiple columns with 10-port switching valve and reverse flow to detect alcohols and ethers.

AERO A700 SPECIFICATIONS		
Column Oven	Temperature	Ambient +5°C to 420°C (increment of 1°C)
	Temperature Accuracy	± 0.05°C (≤250°C)
	Temperature Ramp	0.1 to 80°C / min (max. 22 ramp)
	Capacity	16L
Sample Injection	Temperature	Ambient +5°C to 420°C
	Injection Ports	Up to 3 Ports
	Heating Zone	3
	Flow Control Mode	Automatic Flow / Pressure Control
Detector	Pressure	0 to 40 psi
	Temperature	Ambient +5°C to 420°C
	No. of Detectors	Up to 3 Detectors
	Dimensions (w x d x h)	630 x 570 x 510 mm
GC Main Unit	Weight	55Kg
	Power Requirements	AC 220 - 240V, 50Hz

FID	
Detection Limit	≤ 5 x 10 ⁻¹² g/s (n-hexadecane)
Baseline Noise	≤ 5 x 10 ⁻¹⁴ A
Baseline Drift	≤ 1 x 10 ⁻¹³ A/30min

TCD	
Sensitivity	10,000mV • ml/mg (n-hexadecane)
Baseline Noise	≤ 30µV (99.999% H ₂ gas)
Baseline Drift	≤ 100µV/30min

ECD	
Sensitivity	≤ 3 x 10 ⁻¹⁴ g/ml (γ-BHC)
Baseline Noise	15µV
Baseline Drift	≤ 100µV/30min
Radiation Source	Ni ⁶³ , ≤ 10mCi

NPD	
Detection Limit	N ≤ 5 x 10 ⁻¹² g/s (Azobenzene)
	P ≤ 5 x 10 ⁻¹³ g/s (Malathion)
Baseline Noise	≤ 2 x 10 ⁻¹³ A
Baseline Drift	≤ 4 x 10 ⁻¹³ A/30min

FPD	
Detection Limit	S ≤ 8 x 10 ⁻¹¹ g/s (Parathion-methyl)
	P ≤ 8 x 10 ⁻¹³ g/s (Parathion-methyl)
Baseline Noise	≤ 8 x 10 ⁻¹¹ A
Baseline Drift	≤ 5 x 10 ⁻¹² A/30min

PID	
Detection Limit	S ≤ 5 x 10 ⁻¹² g/s (benzene)
Baseline Noise	≤ 5 x 10 ⁻¹⁴ A
Baseline Drift	≤ 1.2 x 10 ⁻¹² A/30min





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